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## **AirSea Battle**

### **A Point-of-Departure Operational Concept**

JAN VAN TOL

with Mark Gunzinger, Andrew Krepinevich, and Jim Thomas

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# **AIRSEA BATTLE: A POINT-OF-DEPARTURE OPERATIONAL CONCEPT**

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Jan van Tol

*with Mark Gunzinger, Andrew Krepinevich, and Jim Thomas*



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## ABOUT THE AUTHORS

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**Jan M. van Tol**, Senior Fellow, is an expert on long-range strategic planning, military innovation, and wargaming. Prior to his retirement from the Navy in 2007, Captain van Tol served as special adviser in the Office of the Vice-President. He was a military assistant to Andrew W. Marshall at the Department of Defense's Office of Net Assessment from 1993–96 and again from 2001–2003. He commanded three warships, the last of which, USS *Essex* (LHD-2), was a major participant in post-tsunami relief efforts off Sumatra, Indonesia. He holds degrees in philosophy and logic from the University of Massachusetts and in operations research from the Naval Postgraduate School, and graduated with distinction from the Naval War College.

**Mark Gunzinger** joined CSBA as a Senior Fellow in February 2010 after a distinguished career in public service. He is the principal author or co-author of five Defense Planning Guidance/Guidance for the Development of Forces directives, the key strategic planning guidance documents that shape DoD force planning. A retired Air Force Colonel and Command Pilot, he joined the Office of the Secretary of Defense in 2004, serving in several key positions until his appointment in 2006 to Director for Defense Transformation, Force Planning and Resources on the National Security Council. He most recently served as senior advisor to the Air Force for the 2010 QDR. Mr. Gunzinger holds a Master of Science degree in National Security Strategy from the National War College (1996), Master of Airpower Art and Science degree from the School of Advanced Air and Space Studies (1992), and Bachelor's of Science in Chemistry from the United States Air Force Academy (1977).

**Andrew F. Krepinevich, Jr.**, President, is an expert on US military strategy, policy and operations, military revolutions, and counterinsurgency. He gained extensive strategic planning experience on the personal staff of three secretaries of defense, in the Department of Defense's Office of Net Assessment, and as a member of the Defense Policy Board, National Defense Panel, the Defense Science Board Task Force on Joint Experimentation, and

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the Joint Forces Command's Transformation Advisory Board. He is the author of numerous CSBA reports on such topics as the Quadrennial Defense Review, alliances, the war in Iraq, and transformation of the US military. He received the 1987 Furniss Award for his book, *The Army and Vietnam*, and is the author of *7 Deadly Scenarios*. A graduate of West Point, he retired from the US Army in 1993. Dr. Krepinevich holds a Master of Public Affairs and Ph.D. from Harvard University.

**Jim Thomas**, Vice President for Studies, joined CSBA in April 2009. He previously served for thirteen years in a variety of policy, planning and resource analysis posts in the Department of Defense, culminating in his dual appointment as Deputy Assistant Secretary of Defense for Resources and Plans, and Acting Deputy Assistant Secretary of Defense for Strategy. In these capacities, he was responsible for the development of the defense strategy, conventional force planning, resource assessment, and the oversight of war plans. Mr. Thomas spearheaded the 2005–2006 Quadrennial Defense Review (QDR), and was the principal author of the QDR Report to Congress. Prior to joining CSBA, he held the position of Vice President of Applied Minds, Inc., a private research and development company specializing in rapid, interdisciplinary technology prototyping. A former Reserve Naval officer, Mr. Thomas attained the rank of lieutenant commander. He holds a Bachelor of Arts degree with high honors from the College of William and Mary, a Masters degree from the University of Virginia, and a Masters degree from Johns Hopkins University School of Advanced International Studies.

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# EXECUTIVE SUMMARY

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The US military today faces an emerging major operational challenge, particularly in the Western Pacific Theater of Operations (WPTO). The Chinese People's Liberation Army's (PLA) ongoing efforts to field robust anti-access/area-denial (A2/AD) capabilities are threatening to make US power projection increasingly risky and, in some cases and contexts, prohibitively costly. If this occurs, the United States will find itself effectively locked out of a region that has been declared a vital security interest by every administration in the last sixty years. It will also leave longstanding US allies and partners vulnerable to aggression or, more likely, subtle forms of coercion. Consequently, the United States confronts a strategic choice: either accept this ongoing negative shift in the military balance, or explore options for offsetting it. This paper does just that. It offers a point-of-departure concept designed to maintain a stable military balance in the WPTO, one that offsets the PLA's rapidly improving A2/AD capabilities. We have titled this concept "AirSea Battle," in recognition that this theater of operations is dominated by naval and air forces, and the domains of space and cyberspace.

## THE UNPROVOKED CHALLENGE

For well over half a century, the United States has been a global power with global interests. These interests include (but are not limited to) extending and defending democratic rule, maintaining access to key trading partners and resources, and reassuring those allies and partners who cooperate with the United States in defending common interests. The United States' ability to project and sustain military power on a large scale has been, and remains, essential to this endeavor.

During much of the Cold War the Soviet Union posed a serious military challenge to US power-projection capabilities. Fortunately, the two superpowers managed to avoid a major war. Nonetheless, the US military's unsurpassed

ability to project and sustain large forces overseas was demonstrated in limited wars in Korea, Vietnam and the Persian Gulf, as well as in numerous other, smaller contingencies. In the decade or so following the Soviet Union's collapse the US military's power-projection capabilities in defense of the nation's interests were effectively unchallenged.

This state of affairs is almost certainly ending, with significant consequences for US security. With the spread of advanced military technologies and their exploitation by other militaries, especially China's PLA, the US military's ability to operate in an area of vital interest, the Western Pacific, is being increasingly challenged. While Beijing professes benign intentions, it is an old military maxim that since intentions can change overnight — especially in authoritarian regimes — one must focus on the military capabilities of other states.

Currently there is little indication that China intends to alter its efforts to create “no-go zones” out to the second island chain, which extends as far as Guam and New Guinea. Unless Beijing diverts from its current course of action, or Washington undertakes actions to offset or counterbalance the effects of the PLA's military buildup, the cost incurred by the US military to operate in the Western Pacific will likely rise sharply, perhaps to prohibitive levels, and much sooner than many expect.

Hence the United States' strategic choice: to risk a loss of military access to areas vital to its security — and those of key allies and partners to whom it is committed by treaty or law — or to explore options that can preserve the stable military balance that has seen the region enjoy a period of unparalleled peace and prosperity.

Recently the United States Air Force and Navy agreed to address the issue. Both Service chiefs are committed to pursuing a new operational concept called AirSea Battle which appears designed to assess how US power-projection capabilities can be preserved in the face of growing anti-access/area-denial challenges, to include the most formidable challenge, which is posed by the Chinese military.

This is *not* to suggest that the United States seeks a confrontation with China, let alone a war. Indeed, even during the period of unparalleled US military dominance following the Cold War, the United States sought to engage China, not attack or coerce it. A “roll-back” of the PLA's military power is not the objective here. Nor is containment of China proposed. Rather, we advocate simply offsetting the PLA's unprovoked and unwarranted military buildup. Doing so requires an examination of how the US military might minimize Beijing's incentives to achieve its geopolitical ambitions through aggression or, more likely, coercion. This requires that the US military sustain its ability to project sufficient power in the region to defend US interests and protect its friends and allies. This is the key to maintaining the stable military balance that has preserved the peace in the Western Pacific.

## WHAT SHOULD AN AIRSEA BATTLE CONCEPT DO?

An AirSea Battle concept first and foremost must address high-end military operations in the WPTO. To be sure, some of the specific initiatives deriving from a viable concept likely would be applicable elsewhere against other A2/AD capable adversaries, just as the Army and Air Force employed AirLand Battle principles designed to deter the Soviet Union in Central Europe very successfully in both Gulf Wars. However, just as the Soviet Union represented the most severe challenge to the US Army and Air Force during the Cold War, today the PLA represents by far the most serious A2/AD challenge to the Air Force and Navy.

As a doctrine for the operational level of war, AirSea Battle should not be seen as a “war-winning” concept in itself. Nor should it be viewed through the lens of a particular scenario, for example, the defense of Taiwan. Instead, it should be considered as helping to *set the conditions* at the operational level to sustain a stable, favorable conventional military balance throughout the Western Pacific region. This means maintaining an ability to deter China from acts of aggression or coercion in that region and, if necessary, to respond effectively in the event deterrence fails.

AirSea Battle must support overall US strategy for preserving stability in the WPTO. It must address the critical emerging challenges and opportunities that the PLA’s projected A2/AD capabilities will present, and to which currently envisioned US forces do not appear to offer a suitable response. It must account for the WPTO’s geophysical features, particularly its vast distances compared to Europe or the Persian Gulf region and the scarcity of US forward bases, which comprise a small number of very large and effectively undefended sites located on a handful of isolated islands, all within range of the PLA’s rapidly growing missile forces and other strike systems.

AirSea Battle must account for geostrategic factors, such as US treaty and legal obligations to defend formal allies and friends in the region, as well. Even more importantly, *AirSea Battle is not a US-only concept*. Allies such as Japan and Australia, and possibly others, must play important enabling roles in sustaining a stable military balance.

## OPERATIONAL PROBLEMS POSED BY A2/AD SYSTEMS

In crafting an AirSea Battle concept, it is necessary to identify specific operational-level problems a robust A2/AD system would present over the planning horizon, which for DoD is typically the next ten to twenty years. This paper assumes that China will continue enhancing its A2/AD capabilities. Chinese military writings suggest that in the event of conflict, the PLA would conduct large-scale

preemptive attacks designed to inflict severe damage on US forces based or operating in the WPTO; keep other US air and naval forces well out of range or unable to penetrate into the homeland; disrupt US command and control (C2) networks; and heavily constrain US operational logistics by destroying major supply nodes and the relatively few US logistics ships. The overall Chinese strategy appears designed to inflict substantial losses on US forces in a very short period of time, thereby lengthening US operational timelines and highlighting the United States' inability to defend its allies. Once this is accomplished, China would assume the strategic defense and confront the United States with the prospect of either paying a very high (and perhaps prohibitive) cost for reversing its gains, or accepting Beijing's *fait accompli*.

US ground, air and naval forces have long been accustomed to operating from sanctuary. Their main operating bases, ports and facilities have been largely invulnerable to serious conventional attack since World War II. Navy surface and carrier aviation forces are accustomed to operating from sanctuary at sea, enabled by the near-absence of hostile long-range detection and targeting capabilities and capable enemy navies. And US communications, ISR, and precision-guided munitions (PGM) are heavily dependent on high-bandwidth connectivity for command and control, target detection, precision strike, and post-strike battle damage assessment operations. This connectivity is highly reliant on long-haul space-based assets that have hitherto also been accorded sanctuary status, save for the occasional modest localized jamming. The same can be said with respect to cyberspace which, despite numerous and consistent probes by China and other states, and by nonstate entities and individuals, has never been seriously compromised. The growing Chinese A2/AD capabilities, to include its cyber weapons, threaten to violate these long-standing sanctuaries. As this occurs, the consequences for US forces would include:

- > Loss of forward sanctuaries in physical domains and virtual domains (including space, cyberspace, and the electromagnetic spectrum);
- > Denial of access to areas of operations; and consequently
- > Loss of strategic and operational initiative.

While the favorable, stable military balance that has existed in the Western Pacific for the last two decades is deteriorating, neither the Defense Department's planning nor its defense program have been sufficiently modified to account for this fact. Thus DoD continues emphasizing investments that assume it will enjoy sanctuary status as described above, such as short-range rather than long-range strike systems; vulnerable communications satellites; and elaborate—but

fragile—battle networks. This is done at the expense of investing in (among other badly needed capabilities) penetrating, long-endurance ISR and strike capabilities, aerial tankers, forward base hardening, the combat logistics force (CLF) and directed-energy weapons for missile defense.

## THE SUBSTANCE OF AN AIRSEA BATTLE CONCEPT

Our candidate AirSea Battle operational concept describes a WPTO military campaign against the challenge described above, to include its principal components, required missions and tasks, how these would be accomplished, and by what forces. Its successful execution would depend on myriad factors, to include the active and substantial participation of key allies and partners, and the Defense Department's ability to make significant changes in its program of record.

The AirSea Battle campaign has two stages. The initial stage, commencing with the outbreak of hostilities, comprises four distinct lines of operation:

- > Withstanding the initial attack and limiting damage to US and allied forces and bases;
- > Executing a blinding campaign against PLA battle networks;
- > Executing a suppression campaign against PLA long-range ISR and strike systems;
- > Seizing and sustaining the initiative in the air, sea, space and cyber domains.

These lines of operation and their key sub-components have differing execution timelines. While some would unfold in parallel, the initiation of others would depend on progress being made in other aspects of the campaign. Many forces and capabilities would be in high demand across multiple lines of operation, forcing tough decisions regarding their employment.

The follow-on second stage would comprise various operations designed to support US strategy by creating options to resolve a prolonged conventional conflict on favorable terms. These would include:

- > Executing a protracted campaign that includes sustaining and exploiting the initiative in various domains;
- > Conducting “distant blockade” operations;
- > Sustaining operational logistics; and
- > Ramping up industrial production (especially precision-guided munitions).



There would not necessarily be a clean break between stages. Some follow-on operations would simply be continuations of those already ongoing. Nor would there be a clear temporal distinction between stages, in that certain second-stage operations may be conducted while first-stage operations are under way.

## CANDIDATE AIRSEA BATTLE INITIATIVES

Neither the Defense Department's Program of Record forces and modernization profile, nor current Air Force and Navy concepts of operations accord sufficient weight to the capabilities needed to execute an AirSea Battle campaign successfully along the lines of the one described in this report. This report recommends multiple initiatives the Air Force and the Navy should undertake, mostly on a dual-Service basis, to field the necessary forces and capabilities for AirSea Battle. These include initiatives on:

- > Mitigating the missile threat to Guam and other selected bases, and to maritime forces;
- > Correcting the PLA-US imbalance in long-range strike for high-value and/or time-sensitive targets, to include developing and fielding greater penetrating and stand-off long-range ISR and precision strike capabilities and capacities;
- > Enhancing capabilities for undersea operations, to include submarines, submersible robotic systems, and mines;
- > Offsetting the vulnerabilities of space-based C2, communications, and ISR capabilities and capacities, to include fielding high-capacity airborne C3 relay networks to back up space-based systems;
- > Emphasizing future standardization and interoperability of data links, data structures, and C2 and ISR infrastructures;
- > Increasing emphasis on and investment in cross-Service electronic warfare capabilities and capacities;
- > Enhancing cyber warfare offensive and defensive capabilities; and
- > Developing and fielding directed-energy weapons.

## THE CORE OF AIRSEA BATTLE

AirSea Battle rests fundamentally on the tight integration of Air Force and Navy operations in the WPTO—each Service plays a key enabling role for the other in accomplishing critical missions. Some important instances of mutual support include:

- > Air Force counter-space operations to blind PLA space-based ocean surveillance systems, thereby preventing the PLA from targeting high-value Navy surface units, including carriers, thereby enabling Navy operational freedom of maneuver in the maritime domain (Navy platforms could aid counter-space operations in support of the Air Force space control missions if required);
- > Navy AEGIS ships supplementing other missile-defense assets in defense of Air Force forward bases and Japan;
- > Navy submarine-based and carrier-based (if operating long-range air platforms) ISR and strike support against PLA IADS systems to degrade them and thereby enable Air Force strikes;
- > Air Force long-range penetrating strike operations to destroy PLA ground-based long-range maritime surveillance systems and long-range ballistic missile launchers (both anti-ship and land-attack) to expand the Navy's freedom of maneuver and reduce strikes on US and allied bases and facilities;
- > Navy carrier-based fighters' progressive rollback of PLA manned and unmanned airborne ISR platforms and fighters to enable the forward operation of Air Force tankers and other support aircraft; and
- > Air Force support of the ASW campaign through offensive mining by stealthy bombers and persistent non-stealthy bomber strike support of Navy ships conducting distant blockade operations.

## NEEDED: A SENSE OF URGENCY

If a stable military balance is to be preserved in the WPTO, the United States and its regional allies should begin now to develop an AirSea Battle concept and field the forces needed to execute it. The PLA's ongoing military buildup shows no signs of abating, and is of growing concern to regional governments. Adding to this unease is the perception that despite Defense Secretary Robert Gates' efforts to forge a balanced defense posture, at present the balance seems to be between addressing the demands of modern irregular warfare and continuing to field forces more designed for waging the kinds of security threats that are fading into history rather than those now emerging, especially in the form of A2/AD challenges.

There are encouraging signs the Department of Defense intends to place serious emphasis and persistent focus on developing the AirSea Battle concept as a signal of US commitment to security in the Western Pacific and to reassure regional partners in the near-term. Secretary Gates has authorized the Air Force and Navy to craft an AirSea Battle concept, and the chiefs of both Services have endorsed the effort.

Finally, AirSea Battle should be encouraged for reasons independent of the WPTO. The ability of the Air Force and Navy to execute highly integrated operations will enhance their effectiveness across a range of contingencies, while the long-term cost efficiencies appear highly desirable from a budgetary perspective. However, while such reasons might be *sufficient* to justify AirSea Battle, it is the growing military imbalance in the Western Pacific that makes it *necessary*.

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## INTRODUCTION

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This paper contends that the US military today faces an emerging major operational problem, particularly in the Western Pacific, as the fielding of robust anti-access/area-denial (A2/AD)<sup>1</sup> systems and operational approaches over time will make the current “American way of war” increasingly risky and, in some cases and contexts, prohibitively costly. Today the Air Force and the Navy each have their own largely independent plans and doctrine designed to preserve a stable military balance and, failing that, prevail in potential conflicts involving China that could arise in the Western Pacific.<sup>2</sup> It will be argued here that confronting this problem successfully will require integrating many of the Air Force and Navy operations central to operating successfully in an A2/AD environment. The paper will offer some thoughts on key elements comprising an AirSea Battle concept, and conclude with some reflections on what it might take to implement it.

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<sup>1</sup> For the purposes of this paper, anti-access (A2) capabilities are defined as those associated with denying access to major fixed-point targets, especially large forward bases, while area-denial (AD) capabilities are those that threaten mobile targets over an area of operations, principally maritime forces, to include those beyond the littorals. See Andrew F. Krepinevich, *Why AirSea Battle?* (Washington, DC: CSBA, 2010), pp. 8–11.

<sup>2</sup> This is not to say that the AirSea Battle concept presented in this report would be applicable *only* to the Western Pacific Theater of Operations (WPTO). The concept is designed with an eye toward combating advanced A2/AD capabilities, in which the People’s Liberation Army is by far the leader. Just as AirLand Battle, a 1980s concept for combating the threat posed to Western Europe by the Soviet Union, was employed with great effectiveness in the Middle East during the First Gulf War, so too AirSea Battle could prove very effective in a range of contingencies. However, it is designed for the most potentially demanding operational contingency, the WPTO.

## BACKGROUND

Various long-term trends suggest the US near-monopoly on overwhelming military power is steadily eroding.

For well over half a century, the United States' position as a global power has been underwritten by its ability to project and sustain military power worldwide on a large scale to protect and advance its global interests and those of its allies and security partners. During much of the Cold War the Soviet Union posed a serious military challenge to US power-projection capabilities. While the two superpowers managed to avoid a major war, the US military's unsurpassed ability to project and sustain large forces overseas was demonstrated repeatedly in limited wars in Korea, Vietnam and the Persian Gulf, as well as in numerous other smaller contingencies. For the two decades after the Cold War's end, the US military's power-projection capabilities were effectively unchallenged.

Today, various long-term trends suggest the US near-monopoly on overwhelming conventional military power is steadily eroding. The ongoing rise of other states in various measures of their "comprehensive national power (CNP)"<sup>3</sup> including their political, economic and technological dimensions is readily apparent both in absolute and relative terms. In some cases, particularly that of the People's Republic of China, impressive economic progress over two decades has enabled the acquisition of substantial military capabilities, quantitatively and, increasingly, qualitatively.

Moreover, various foreign militaries and other observers have closely studied "the American way of war" as it was dramatically demonstrated in recent years.<sup>4</sup> While their motivations for acquiring advanced military capabilities may vary, it is clear that some foreign states' military investment programs have been designed with an eye towards countering US military power projection, should it be directed against them.

The case of China is particularly noteworthy for several reasons. First, the Chinese decision to initiate large annual increases in military spending, which continue unabated through the present, appears to have been taken in direct response to the US intervention in the 1995–1996 Taiwan Strait crisis, during which the United States sent two carrier strike groups to the area in response to Chinese ballistic missile firings near Taiwan. Second, China's remarkable economic performance of the past two decades has underwritten its financial ability to acquire and sustain a large and increasingly sophisticated military establishment. Third, Chinese technological prowess continues to increase dramatically, as illustrated

<sup>3</sup> CNP "generally means the sum total of the powers or strengths of a country in economy, military affairs, science & technology, education and resources and its influence (China Institute of Contemporary International Relations, 2000)" See Hu Angang, "The Rise of Modern China: Comprehensive National Power (CNP) and Grand Strategy," <http://www.irchina.org/en/pdf/hag.pdf>.

<sup>4</sup> See, for example, Brigadier V.K. Nair, *War in the Gulf: Lessons for the Third World* (New Delhi, India: Lancer International, 1992). Certainly the Chinese military paid close attention to the effectiveness of US operations during the First Gulf War as well.

by its expanding ability to build (and increasingly design) indigenous high-technology products, including the production of airliners, automobiles, information technology, and space systems. Fourth, whereas Chinese military equipment traditionally was either foreign-bought or built under license, it is increasingly being built indigenously.<sup>5</sup> Fifth, the growing sophistication of Chinese weapons and the supporting doctrine, organizational, training, materiel, leadership, personnel and facilities (DOTMLPF) and the professionalization of the People's Liberation Army (PLA) has been amply documented.<sup>6</sup>

Most importantly, though, many of the capabilities the Chinese military is acquiring reflect a deliberate anti-access and area-denial (A2/AD) operational approach that is specifically designed to keep the military forces of the United States and other potentially unfriendly powers from approaching close to China. The PRC appears to be purposefully developing and fielding offensive capabilities that challenge US freedom of action in all domains—space, cyberspace, at sea and in the air. Chinese military writings strongly support this proposition, despite the frequent protestations by China's leaders that China intends to pursue only a “peaceful rise,” and that therefore its growing military capabilities are no threat.

As Chinese military capabilities steadily develop, the US ability to project power in the Western Pacific and the credibility of its guarantees to regional security partners will inevitably be questioned. Moreover, specific capabilities being developed and fielded by the PLA<sup>7</sup> threaten to turn many of the US military's most expensive and hitherto most formidable platforms into “wasting assets”—that is, put them at such risk of damage, loss or ineffectiveness in the event of conflict that they effectively become unusable.<sup>8</sup>

This is *not* to suggest that war between China and the United States is inevitable or even likely. Indeed, states and non-state actors in other regions present significant actual threats that seem far more immediate to US security interests. However, some of the same trends emerging so strongly in China also apply to them, particularly the proliferation of technologies with military applications that could increasingly threaten US military power projection and forward presence operations. Thus it is prudent to assume that, in the future, US forces will

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<sup>5</sup> See, for example, “Russian arms exports to China in collapse — report,” January 29, 2008, at <http://www.forbes.com/feeds/afx/2008/01/29/afx4585077.html>, and Steven Blank, *Rosoboronekspart: Arms Sales and the Structure of Russian Defense Industry*, Strategic Studies Institute, US Army War College, January 2007, p. 28,42, at <http://www.strategicstudiesinstitute.army.mil/pdffiles/PUB749.pdf>.

<sup>6</sup> See, for example, the Department of Defense's Annual Reports to Congress on “Military Power of the People's Republic of China.”

<sup>7</sup> The People's Liberation Army (PLA) refers to all components of the Chinese military, including the PLA Air Force (PLAAF) and the PLA Navy (PLAN). This paper uses the term “PLA” to refer to any or all of these components, depending on the context.

<sup>8</sup> For a detailed analysis, see Andrew Krepinevich, “The Pentagon's Wasting Assets,” *Foreign Affairs*, July–August 2009.

face at least some of the elements of an A2/AD operational approach in contexts other than that of the Western Pacific. It is, however, in that theater that the A2/AD challenge is most clearly emerging.

The challenge posed by rising powers is not new. A century ago, Great Britain, then the leading world power, confronted a rising Germany that, while professing friendship, had started to build a powerful navy that had the potential to one day threaten Britain's traditional command of the seas. In January 1907, Eyre Crowe, an official in the Foreign Office, wrote an influential memorandum to the British Foreign Minister, laying out the dilemma:

If it be considered necessary to formulate and accept a theory that will fit all the ascertained facts of German foreign policy, the choice must lie between the two hypotheses here presented: Either Germany is definitely aiming at a general political hegemony and maritime ascendancy, threatening the independence of her neighbours and ultimately the existence of England; [o]r Germany, free from any such clear-cut ambition, and thinking for the present merely of using her legitimate position and influence as one of the leading Powers in the council of nations, is seeking to promote her foreign commerce, spread the benefits of German culture, extend the scope of her national energies, and create fresh German interests all over the world wherever and whenever a peaceful opportunity offers... In either case Germany would clearly be wise to build as powerful a navy as she can afford. The above alternatives seem to exhaust the possibilities of explaining the given facts.<sup>9</sup>

As Paul Kennedy writes:

Would Germany be content solely to expand economically, thus contributing greatly to the general level of Europe's prosperity; or would her rulers seek to translate this industrial strength into political advantage, by forcing her neighbours to become satellite states, by constructing an enormous battlefleet for possible future use, and by demanding colonial concessions under the threat of taking military action in Europe? It was impossible for Britain's leaders to know the answer to these questions—even Crowe's 1907 memorandum postulated a policy of general, non-violent growth for Germany as an alternative to "aiming at general political hegemony and maritime ascendancy"—and it was therefore necessary for London both to keep a watchful eye upon Berlin and to be willing to explore all occasions which might safely lead to the improvement of relations.<sup>10</sup>

Today, it is incontestable that the only state with the long-term potential to pose a serious and sustained challenge to US influence and power projection in its region for the foreseeable future is China. Complicating matters is China's lack of transparency regarding the basis for its ongoing defense buildup, which has

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<sup>9</sup> The complete memorandum text may be found at [http://tmh.floonet.net/pdf/eyre\\_crowe\\_memo.pdf](http://tmh.floonet.net/pdf/eyre_crowe_memo.pdf).

<sup>10</sup> Paul M. Kennedy, *The Rise of the Anglo-German Antagonism: 1860–1914*, (London: The Ashfield Press, 1987), pp.316–317.

been noted by successive US secretaries of defense and other American leaders. The situation is exacerbated further still as China is the only great power that has failed to embrace democracy. Given these considerations, it becomes imperative to assess how the US military might sustain its ability to successfully project military power in the region in order to defend US interests and protect its friends and allies.<sup>11</sup> This is the key to maintaining the stable military balance that has preserved the peace in the Western Pacific for a generation while also enabling China to enjoy a period of unprecedented peace and prosperity. Although China's intentions may be peaceful, failure to maintain such a balance may invite acts of aggression or, more likely, coercion and "Finlandization."<sup>12</sup>

The potential for a mismatch between the capabilities required to project power and conduct air, sea, space and cyberspace operations successfully in the face of an evolving and increasingly robust Chinese A2/AD network on the one hand, and currently planned US military capabilities, force structure and operational approaches on the other, clearly suggests the need to explore a new concept, "AirSea Battle," to address this coming challenge.

## AIRLAND BATTLE AS METAPHOR

The AirLand Battle concept was developed by the Army and Air Force in the late 1970s and implemented in the early 1980s in response to a daunting operational problem faced by NATO on the European Central Front. By the mid-1970s, the growing Soviet conventional superiority on the Central Front, coupled with the "hollow Army" that emerged in the post-Vietnam period, raised concerns over the stability of the Central European military balance. The rapidity and destructiveness of the 1973 Yom Kippur War revealed that advances in weapons technology could make modern combined-arms conflicts short and brutal affairs. By the late 1970s, developments such as the Soviet invasion of Afghanistan suggested the extent to which Soviet military technology had closed the quality gap with the US military while it was preoccupied with Vietnam.

Both the Army and the Air Force had their own largely independent plans and doctrine for a Central Front war against Soviet and Warsaw Pact forces. But it was increasingly obvious that such a bifurcated approach was insufficient to deal with the Soviet challenge. Thus the Army and Air Force confronted a situation where:

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<sup>11</sup> Note that "power projection" refers both to the ability to deploy forces and capabilities into theater and the freedom to maneuver and act in all operational domains.

<sup>12</sup> "Finlandization" refers to neutralization of a small country by a superpower, using conciliation, as the former Soviet Union did in relation to Finland. See Collins English Dictionary — Complete and Unabridged 6th Edition 2003. © HarperCollins Publishers 2003.



- > NATO would fight badly outnumbered;
- > US and allied forces might not have sufficient qualitative superiority to offset their quantitative disadvantage;
- > Contemporary military technology had seemingly increased the lethality of battle while decreasing its likely duration;
- > Large Soviet and Warsaw Pact follow-on forces would be able to rapidly exploit weaknesses at the Forward Edge of the Battle Area (FEBA) through newly created formations such as Operational Maneuver Groups; and
- > NATO political imperatives precluded any sort of defense-in-depth.

AirLand Battle sought to revitalize and refocus the Army and Air Force after a decade of irregular warfare in Vietnam and the concomitant erosion of their conventional warfighting capabilities. Enabled by new intelligence, surveillance and reconnaissance (ISR) platforms that could “see deep,” while new weapons would allow them to “shoot deep,” senior leaders in both Services deliberated new concepts such as the “extended battlefield,” which included elements of time and air-ground integration, and “fighting deep” beyond the FEBA. Cooperation between the two Services was seen as fundamental to successful defense of the Central Front in the face of the Soviet threat.

Together, the Air Force and Army envisaged an “extended battlefield” geographically and temporally. Geographically, this extended battlefield would stretch up to 150km beyond the FEBA. Temporally, the ability to attack forces at such distances translated into days of delay for enemy forces to be reinforced, which would influence actions in the close-in fight along the FEBA. Air Force strike aircraft, Army indirect fires, and Special Forces would conduct rear-area attacks and interdict second-echelon forces far behind the FEBA, thereby delaying their reinforcement of the enemy vanguard and returning the initiative to US and allied forces. This was the essence of AirLand Battle.

Developing an AirLand Battle concept was considered vital because it would provide both a foundation for future Army and Air Force battlefield cooperation and the rationale for a new generation of capabilities that would allow US and NATO forces to “look deep and shoot deep.”<sup>13</sup> Indeed, in the mid-1980s, the chiefs of staff of the Army and Air Force published a Memorandum of Agreement on “US Army-US Air Force Joint Force Development Process.” Better known as the “31 Initiatives” memo, it specified how the Army and Air Force would jointly develop a series of capabilities to achieve synergies in procurement and operations.<sup>14</sup>

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<sup>13</sup> Donn A. Starry, “Extending the Battlefield,” *Military Review* (March 1981), p.33.

<sup>14</sup> The memo appears in Tab A. It can be accessed at <http://www.history.army.mil/books/dahsum/1984/appA.htm>.

While some of the initiatives were simply commitments to study a particular issue jointly, others had important programmatic outcomes.

In addition to spurring the development of new American tactics and weapons systems, the AirLand Battle doctrine also facilitated the development of a similar NATO operational concept known as Follow-on Forces Attack (FOFA).<sup>15</sup> In other words, AirLand Battle changed the way the defensive problem on NATO's Central Front was viewed, and spurred the development of new platforms, sensors, weapons, and tactics. These changes, in turn, transformed the way that the Army, Air Force, and NATO allies planned to deter and if necessary fight the Warsaw Pact military forces.

## FROM AIRLAND TO AIRSEA BATTLE

In practice, the AirLand Battle doctrine ultimately was not a true Joint, or even multi-Service, doctrine. Some soldiers and airmen shared a common vision, but this vision did not extend throughout either the Army or the Air Force. Most of the "31 Initiatives" were not implemented jointly, though the Army or the Air Force substantively implemented many on an individual Service basis. Indeed, while there was Air Force-Army cooperation, AirLand Battle was primarily an Army, not Air Force, doctrine. Much of the subsequent lack of follow-up action could be attributed to inherent Service parochialism and bureaucratic opposition.<sup>16</sup> Thus AirLand Battle should not necessarily be considered as a "tight metaphor" for an AirSea Battle concept in the sense of being a successful model for inter-Service cooperation.

Rather, the real metaphor is the *intellectual transition* from identification of a major emerging operational challenge to:

- > Accepting the clear need for new operational approaches and supporting operational concepts in the face of evidence that current ones will likely be insufficient (or increasingly suboptimal) for addressing new and more threatening challenges at the operational level of war to;
- > Investigating and assessing potential alternative multi-Service operational concepts to;
- > Developing guidance for shifts in procurement of capabilities and capacities to support the most promising operational concept.

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<sup>15</sup> See US Congress, Office of Technology Assessment, Technologies for NATO's Follow-on Forces Attack Concept (Washington, D.C.: Government Printing Office, July 1986), available online at <http://www.fas.org/ota/reports/8630.pdf>, accessed on March 26, 2008.

<sup>16</sup> Indeed, there has been considerable skepticism of the ASB concept expressed by Air Force and Navy participants in recent discussions for arguably the same reasons. In particular, the severe historical circumstances that precipitated the thinking that ultimately led to ALB may not be perceived by important actors to exist at present.

Just as AirLand Battle doctrine development was spurred by the shifting military balance in Central Europe, a viable AirSea Battle concept must address the implications of a shifting military balance in the Western Pacific. The first paper of this two part-series described China's already burgeoning A2/AD capabilities in some detail.<sup>17</sup> This report examines how the US military might address this challenge by presenting a point-of-departure AirSea Battle operational concept, including some candidate metaphorical equivalents to AirLand Battle's "31 Initiatives," with the goal of sparking some useful debate over this growing problem for US security.

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<sup>17</sup> For a more detailed discussion of the need for an AirSea Battle concept, see Andrew Krepinevich, *Why AirSea Battle?* (Washington, DC: Center for Strategic and Budgetary Assessments, Washington, DC, 2010).

## CHAPTER 1 > WHAT SHOULD AN AIRSEA BATTLE CONCEPT DO?

An AirSea Battle concept first and foremost must address high-end military operations in the Western Pacific Theater of Operations (WPTO) as opposed to being a generalized concept. To be sure, some of the specific initiatives deriving from a viable concept likely *would* be applicable elsewhere. However, it seems equally clear that, absent the emerging operational problems in the Western Pacific, there would be considerably less impetus to investigate the risks and opportunities associated with such a concept.<sup>18</sup> Moreover, it seems unlikely that many of the initiatives suggested in this paper would be accorded serious consideration, let alone be implemented, absent the specific emerging challenges to the Western Pacific military balance.

It must be emphasized that an AirSea Battle concept is *not about war with China*. Nor is it about “rolling back” Chinese influence, or even about “containing” China. Rather, it should be seen as part of a larger “offsetting strategy” that acknowledges that China’s tremendous economic achievement simultaneously enables it to acquire formidable military capabilities. AirSea Battle further affirms the continuing US vital interest in maintaining American influence in the East Asian region to include *preserving a stable military balance*—a balance that has enabled twenty years of peace and unprecedented prosperity in the region, with China its greatest beneficiary. One of the key elements of such an offsetting strategy is demonstrating a continuing US ability to reassure allies and partners in the region that they will not be the victims of coercion or a form of “Finlandization” on the part of China.<sup>19</sup> To accomplish this, the United States

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<sup>18</sup> It should be noted that the joint Air Force-Navy AirSea Battle Concept Development Group (CDG) established in mid-2009 to develop an AirSea Battle concept has a wider, more generalized conception of what an eventual concept or doctrine should address.

<sup>19</sup> This is already a matter of concern for some friendly governments in the region. See, for example, Mark Thomson, “Trends in US defence spending: implications for Australia,” Policy Analysis Nr. 56, Australian Strategic Policy Institute, March, 16, 2010.

AirSea Battle, as a doctrine for the operational level of war, cannot and should not be seen as a “war-winning” concept in itself.

must have a demonstrable ability to intervene effectively in the event of a military confrontation or even conventional conflict with China. Although neither side desires such an outcome, it could result as a consequence of Beijing’s efforts to bring about a major shift in the military balance. The continuing demonstration of US ability to dominate at any level of escalation is critical to maintaining crisis stability in the event of Sino-US tensions or confrontation. Thus AirSea Battle should be seen as an important contribution to *prevention* of Sino-US conflict by—somewhat paradoxically—increasing confidence on the part of all regional actors that China would ultimately fail to realize its objectives through military aggression or coercion.

AirSea Battle, as a doctrine for the operational level of war, cannot and should not be seen as a “war-winning” concept in itself. Nor should it be viewed through the lens of a particular scenario, for example, the defense of Taiwan. Instead, it should be considered as helping to *set the conditions* at the military operational level to sustain a stable, favorable conventional military balance throughout the Western Pacific region. This means maintaining an ability to deter China from acts of aggression or coercion in that region and, if necessary, to respond in the event deterrence fails.

An AirSea Battle concept must do the following:

**STRATEGIC LEVEL.** In the event of actual conflict, AirSea Battle must support the United States’ strategy for preserving stability in the Western Pacific. While discussion of any such wider war strategy lies beyond the scope of this paper, the Western Pacific components of any plausible strategy would include defending US territory (e.g., Guam) and bases/facilities; defending key allies; protecting US and friendly state seaborne commerce; interdicting Chinese seaborne commerce; neutralizing/defeating Chinese military forces; and conducting other power-projection operations throughout the Western Pacific as directed.

To preserve stability, AirSea Battle should contribute to a cost-imposing strategy vis-à-vis the Chinese military, inducing or encouraging the PLA to invest in more costly counters in areas less dangerous to US forces and operations.<sup>20</sup>

**OPERATIONAL LEVEL.** AirSea Battle must address the critical emerging challenges and opportunities that projected Chinese A2/AD capabilities will present, and to which currently envisioned US forces do not appear to offer a suitable response. In general, since A2/AD capabilities seek to impose ever-greater constraints on US operational freedom of action, an AirSea Battle concept must address how the challenge can be offset or, failing that, how freedom of action can be regained in

<sup>20</sup> See, for example, Robert Martinage, *Dissuasion Strategy*, brief to Congress, May 6, 2008, accessed at [http://www.csbaonline.org/4Publications/PubLibrary/S.20080506.Dissuasion\\_Strateg/S.20080506.Dissuasion\\_Strateg.pdf](http://www.csbaonline.org/4Publications/PubLibrary/S.20080506.Dissuasion_Strateg/S.20080506.Dissuasion_Strateg.pdf).

at least selected temporal/positional aspects for purposes of power projection. Specific challenges posed by A2/AD capabilities will be discussed more fully in the next chapter.

**TACTICAL LEVEL.** The expected character of future combat operations in the Western Pacific suggests that the outcomes of certain interactions at the tactical level (e.g., offensive missiles versus missile defenses) could have operational-level consequences. An AirSea Battle concept must therefore address the most salient of these.

## KEY GEOPHYSICAL FACTORS

A theater's geophysical features are necessarily a key factor shaping an operational concept. Given that the United States has neither the desire nor the capability to conduct major land operations in China proper, the geography of the Western Pacific theater dictates that it is primarily an aerospace and maritime theater dominated by the Air Force and Navy.<sup>21</sup> Moreover, the theater's size is enormous compared to Europe or the Persian Gulf regions (see Figure 1).

PLA military theorists see two key island chains as forming the geographic basis for expanding China's maritime sphere of influence. While these have not been formally defined as such by PLA leaders, the "First Island Chain" is generally thought to run from the Japanese main islands through the Ryukyus, Taiwan, the Philippines, and Borneo, thus roughly bounding the East and South China Seas. The "Second Island Chain" stretches from the north at the Bonin Islands southward through the Marianas, Guam, and the Caroline Islands, encompassing the western Philippine Sea (see Figure 2).

The US military faces a major basing disadvantage in the Western Pacific. Apart from increasingly vulnerable bases and facilities on allied territory, bases and facilities on US territory in the Western Pacific comprise a small number of very large and effectively undefended sites located on a handful of isolated islands, all within range of PLA weapons systems. China, by contrast, as an illustrative comparison, has some twenty-seven airbases within range of Taiwan alone, while its mobile ballistic missile forces enjoy the benefit of the country's great size and strategic depth.

The US military faces a major basing disadvantage in the Western Pacific.

Concepts of operation must account for the huge asymmetry in distances.

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<sup>21</sup> This is not to say that neither the Army nor the Marine Corps have a role to play in AirSea Battle. For comparison, even though the AirLand Battle concept was primarily an Army and Air Force effort, the Navy also had a role to play in securing the sea lines of communication across the Atlantic Ocean and preparing for what was called the Outer Air Battle with Soviet air forces. Likewise, the Marines had contingency plans to reinforce Norwegian forces to preclude a Soviet move in Scandinavia to turn NATO's northern flank. Similarly, as the core features of AirSea Battle are established, they will likely have significant implications for the two ground Services.

Any consideration of concepts of operation in the Western Pacific must also account for the huge asymmetry in distances. The US military must transport virtually everything it needs across thousands of miles to sustain operations against an adversary operating in its “front yard.” Yet another unfavorable asymmetry confronting US forces is the concentration of their logistics around a few key nodes. The main Air Force and Navy bases on US territory in the Western Pacific are located on the island of Guam, the major logistics node for all US military operations in the Western Pacific. This creates enormous logistical vulnerabilities that could offer the PLA the opportunity (and perhaps even the *incentive*) to cripple US power-projection capability by attacking and incapacitating a handful of soft facilities. In contrast, China enjoys the advantages of the strategic depth conferred by its large landmass. For example, it can rely on a highly distributed logistics network as it draws upon supplies stationed on its own territory. Finally, the PLA enjoys an asymmetric advantage over the US military in its ability to

FIGURE 1. ILLUSTRATIVE DISTANCES IN THE PACIFIC THEATER

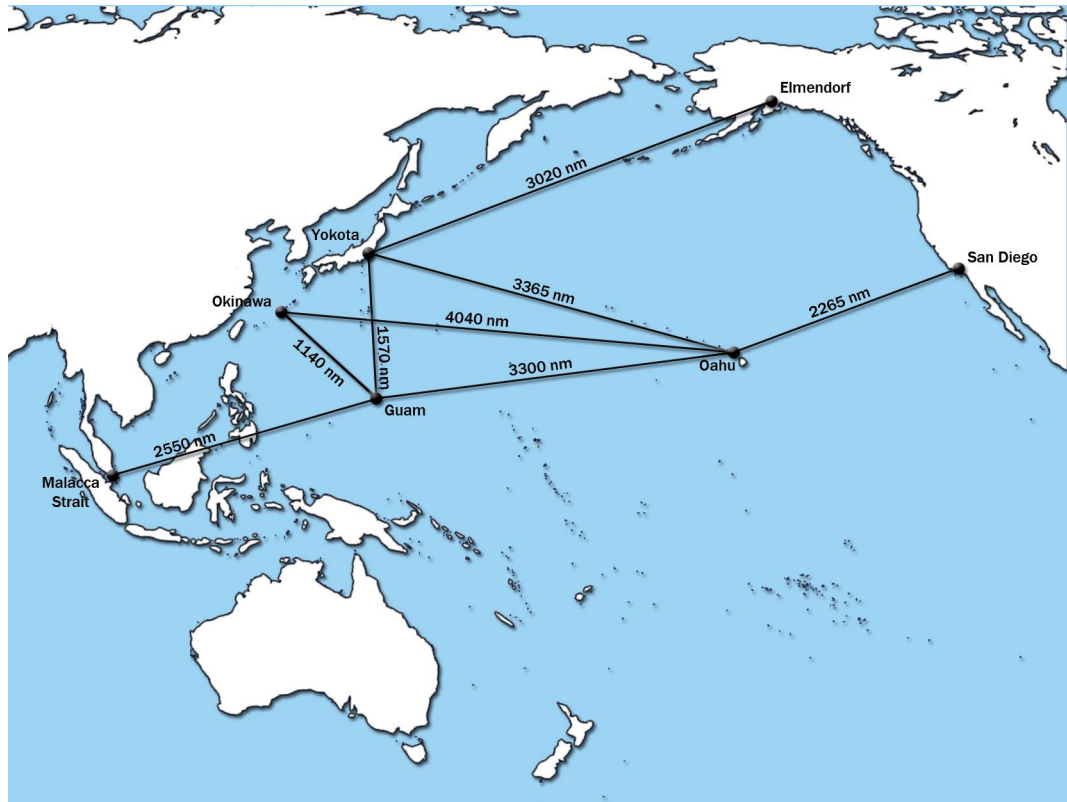


Image: CSBA

exploit interior lines of communication that enable it to shift its focus much more rapidly from one area along its periphery to another, while US forces would have to penetrate deeply into defended airspace to attack critical military targets, if doing so were necessary.

## KEY GEOSTRATEGIC FACTORS

The United States is bound by treaty to defend its formal allies, Japan and South Korea, and by US law to defend Taiwan should it be subject to armed attack by China. These three countries, as island nations (or a de facto island in the

**FIGURE 2. THE TWO ISLAND CHAINS AND MAJOR US BASES IN THE WESTERN PACIFIC**

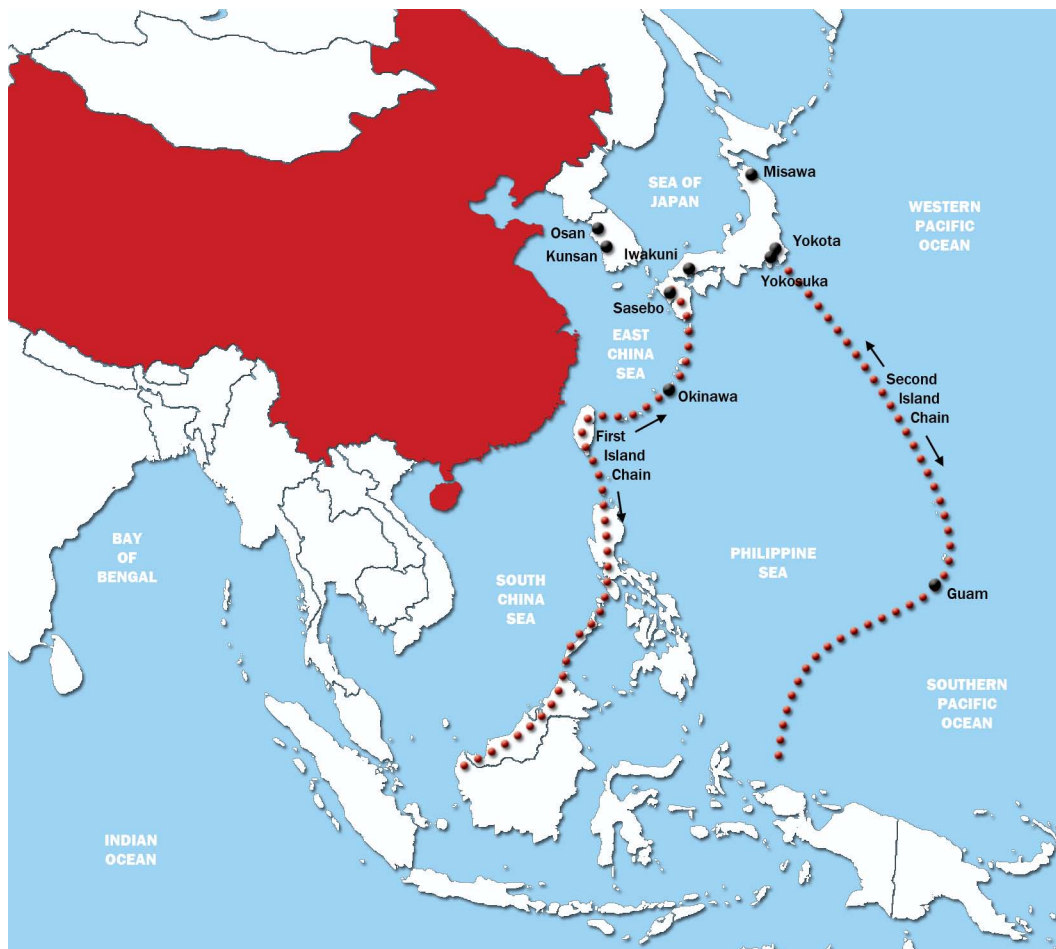


Image: CSBA



Current trends suggest the potential for a very robust and comprehensive PLA A2/AD system to be in place within this decade.

case of South Korea), lack strategic depth, and must therefore be supported and defended from the sea, or by assets arriving by or over the sea. Since they are located so close to China as to be under permanent threat from missile barrages, US forces coming to their defense must be able to survive and operate within the threat envelope of Chinese weapons systems. A perceived inability on the US military's part to meet its obligations would call into question the credibility of US security assurances, might serve to encourage Chinese coercion, if not aggression, and could serve as a catalyst for a regional arms race, perhaps involving nuclear proliferation.

Given these considerations, it seems likely that in order to sustain the viability of US power-projection operations in the Western Pacific Theater, particularly in the northeast Asia sub-region, the United States will be dependent to some degree upon Japan's active support. Japan offers a measure of strategic depth in its northern and eastern regions, while the geography of the Ryukyus island chain may prove particularly advantageous for anti-submarine warfare (ASW) operations, for example. Were Japan to cease being a US ally or opt to stay neutral in the event of a Sino-US clash, the ability to execute an AirSea Battle concept would be made more difficult. Absent Japan's support, a successful defense of Taiwan or South Korea would be problematic, at best. Thus for the purposes of this paper, Japan is assumed to remain an active long-term ally of the United States.

## TIME HORIZON

From the perspective of 2010, the US Air Force and Navy appear to be as dominant as ever in the Western Pacific. Current Chinese systems that could constitute an emerging A2/AD operational approach are in many cases still quite rudimentary and less capable than their US counterparts. But as various Department of Defense Annual Reports to Congress on "Military Power of the People's Republic of China" have noted, the rate of both quantitative and qualitative improvements in Chinese military forces have been remarkable as well as sustained.<sup>22</sup> Extrapolation of current trends suggests the potential for a very robust and comprehensive PLA A2/AD system to be in place within this decade. This system will significantly alter the regional military balance if not addressed.<sup>23</sup>

<sup>22</sup> "Admiral Willard Discusses China, North Korea," accessed at <http://www.eagleworldnews.com/2009/10/21/admiral-willard-discusses-china-north-korea/>, on December 9, 2009. Admiral Willard, then the new Pacific Command commander, stated that "in the past decade or so, China has exceeded most of our intelligence estimates of their military capability and capacity, every year. They've grown at an unprecedented rate in those capabilities. And, they've developed some asymmetric capabilities that are concerning to the region, some anti-access capabilities and so on."

<sup>23</sup> This growing military imbalance will be further compounded by the steady decline in US Air Force and Navy force structure called for in the current Program of Record.

Thus this paper assumes that absent any current evidence to the contrary, China will continue down its well-established path well into the future. The discussion of various operational problems this robust A2/AD system will cause the US military (and hence what should go into an AirSea Battle concept to counter it) are based on this premise. Moreover, as will be seen, many of the elements that should go into a viable concept would themselves require considerable time for the US military to implement.

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The next chapter will discuss the major operational problems that robust PLA A2/AD systems may pose for US military forces. Readers already familiar with the Western Pacific theater and the A2/AD challenges there may prefer to go directly to Chapter 3 (“The Substance of an AirSea Battle Concept”).



## CHAPTER 2 > OPERATIONAL PROBLEMS POSED BY ROBUST A2/AD SYSTEMS

Before assessing what an AirSea Battle concept should address and include, it is necessary to have an idea of what specific operational-level problems a robust A2/AD system could create for US military forces in the next ten to twenty years, assuming that those forces would reflect logical extensions of the current Program of Record and that the US operational approach would remain quite similar to what it is today.

Since an AirSea Battle concept is ultimately about warfighting, a Sino-US conflict construct must be posited in order to think about it seriously. This necessarily entails imagining a future scenario in which current military trends continue, relations between the United States and China deteriorate greatly over time, and events lead to steadily growing tension, confrontation, crisis, and eventually open conflict.

It is worth reemphasizing at this point that thinking about a warfighting concept in this way does *not imply a belief that a Sino-US war will occur*. To the contrary, developing a concept whose implementation could preserve a stable military balance and demonstrate convincingly that US forces could defeat the Chinese A2/AD battle networks in the event of conflict would tend to strengthen deterrence. It would also enhance crisis stability and escalation control by reducing the likelihood of misperceptions of the Sino-US military balance or other sources of serious miscalculation. But to think about what is entailed by that logically requires describing what a putative conflict (here in its Western Pacific *military* aspects) could look like, and then assessing what would be required for the United States military operationally.

What follows comprises a planning experiment that assumes that China indeed continues enhancing its A2/AD system over the next decade, thereby upsetting the military balance and, in so doing, dramatically reduces the barriers to aggressive action, to include coercion.

Thinking about a warfighting concept does *not imply a belief that a Sino-US war will occur*.

## A REPRESENTATIVE PLA ORDER OF BATTLE

Based on current trends and plausible defense investment rates, the representative PLA forces depicted below would seem to be well within the range of fiscal and technological possibility over the next decade. Some examples of existing and emerging Chinese capabilities include:

- > Kinetic and non-kinetic anti-satellite weapons and supporting space launch and space surveillance infrastructure;
- > Sophisticated cyber- and electronic warfare capabilities;
- > Long-range ISR systems (airborne; space-based; land-based over-the-horizon radar (OTH-R));
- > Precision-guided conventional land-attack and anti-ship cruise and ballistic missiles numbering in the thousands, that can be launched from multiple air, naval, and mainland-based mobile ground platforms throughout the theater (see Figure 3);

**FIGURE 3. RANGE OF PLA MISSILES AND STRIKE AIRCRAFT (COMBAT RADIUS, UNREFUELED)**

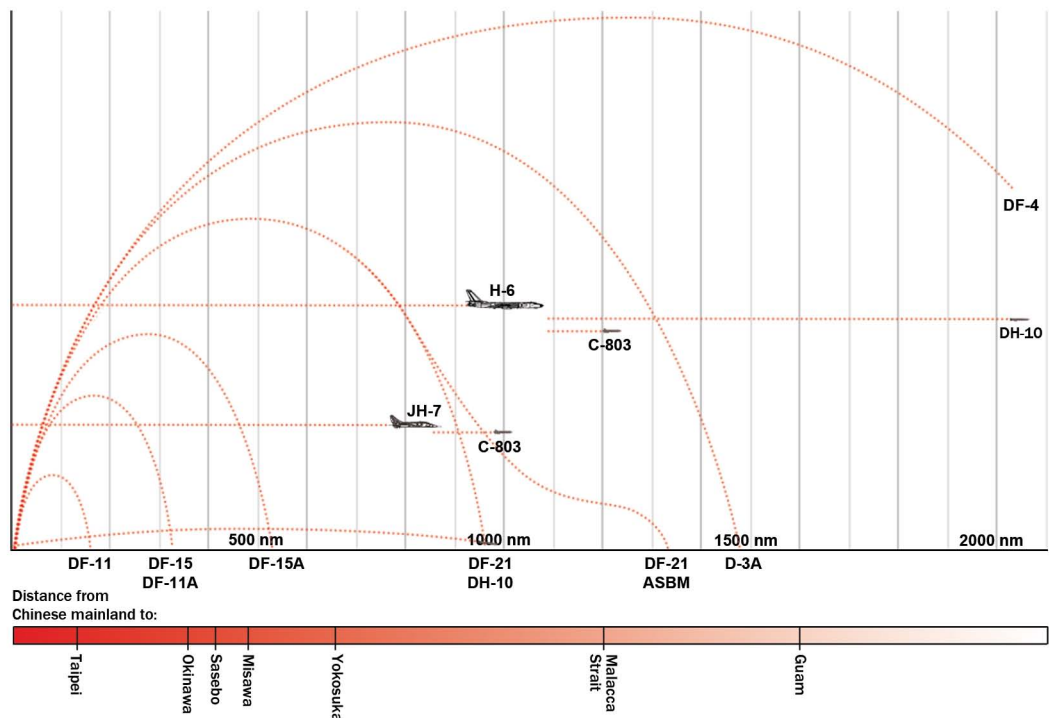


Image: CSBA

- > Scores of quiet diesel (and some nuclear) submarines armed with supersonic sea-skimming anti-ship cruise missiles and advanced torpedoes;
- > An emerging ballistic missile submarine (SSBN) force;
- > Very large inventories (tens of thousands) of advanced sea mines;
- > Multi-layered integrated air defense systems (IADS), including a large numerical superiority in modern fighter/attack aircraft, and fixed and mobile surface-to-air missiles numbering in the thousands;
- > Comprehensive reconnaissance-strike battle networks covering the air, surface and undersea domains; and
- > Hardened and buried closed fiber-optic command and control (C2) networks tying together various systems of the battle network.

Operationally, PLA military writings suggest that China's evolving reconnaissance-strike networks are designed to:<sup>24</sup>

- > Deny the United States operational sanctuary in space — the PLA is very aware of the US reliance on space systems for ISR, C2, communications, precision navigation, and precision timing;
- > Threaten all US operating bases in the Western Pacific, including those in Japan, with persistent ballistic and cruise missile attacks — the concomitant ability to strike allies and partners has implications for their willingness to support US basing access;
- > Threaten major US Navy surface forces out to 1200+ nm, thereby pushing aircraft carriers far beyond the maximum unrefueled ranges of their current and projected strike aircraft (with the notable exception of Navy UCAS<sup>25</sup>) and surface warships beyond the range of their land-attack cruise missiles (LACM);
- > Impede US submarine operations in the littorals — while Chinese submarine ASW capability is marginal and does not appear to be becoming a primary mission area, US undersea operations are likely to be increasingly impeded by deployment of advanced arrays of undersea sensors and potentially weapons in littoral waters and narrows;

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<sup>24</sup> The PLA uses the term *Shashoujian*, or “Assassin’s Mace,” to characterize its operational approach. See Krepinevich, *Why AirSea Battle?* pp.13–14.

<sup>25</sup> N-UCAS is a projected unmanned strike aircraft with an expected range of over 2,000 miles.

**The overall PLA strategy may be to inflict substantial losses on US forces, lengthen US operational timelines and highlight the United States' inability to defend its allies.**

- > Contest US air operations over or near mainland China and adjacent allied territory—expanding advanced IADS with hardened, buried and redundant C2 networks coupled with counter-stealth radar, and increasing numbers of high-end SAMs and fourth/fifth-generation fighters will make US penetration ever more difficult and costly; and
- > Conduct cyber attacks against US battle networks aimed at disrupting logistics, corrupting C2 systems, degrading fire control radars, denying essential services, and degrading US counter-space control, space situational awareness and space ground control stations. These likely would not, however, be limited to direct attacks on US military networks, but could be part of a larger Chinese cyber offensive against US and allied networks of all kinds globally. Such attacks against non-military networks would also impact military operations significantly due to the US military's heavy reliance on the civilian information backbone for many communications and support functions.

## **AN ILLUSTRATIVE PLA ATTACK**

Over the past several years, various researchers have conducted studies examining what a large-scale attack against US forces and allies in the Western Pacific could look like in order to examine what military operations under such conditions could entail. They postulate a potent adversary armed with forces and an A2/AD operational approach like those depicted above, and an aggressive strategy to establish long-term regional dominance by recovering Taiwan, keeping Japan out of the war or forcing it out if it became engaged, and driving US forces out to the Second Island Chain.

What follows is a summary of postulated PLA A2/AD operations, based on PLA writings.<sup>26</sup> The PLA may be planning to conduct large-scale preemptive attacks designed to inflict severe damage on Japanese military forces and US forces based or operating forward; keep other US air and naval forces well out of range or unable to penetrate into the homeland; disrupt US command and control (C2) networks; and heavily constrain US operational logistics by destroying major supply nodes and the relatively few US logistics ships. The overall strategy may be to inflict substantial losses on US forces, lengthen US operational timelines and highlight the United States' inability to defend its allies. Once this is accomplished, the PLA could assume the strategic defense and deny reinforcing US forces access to the theater until the United States determines that it would be

<sup>26</sup> See Roger Cliff, Mark Burles, Michael S. Chase, Derek Eaton, and Kevin L. Pollpeter, *Entering the Dragon's Lair: Chinese Anti-Access Strategies and Their Implications for the United States*, (Santa Monica: RAND, 2007) for a good discussion of such writings.

too costly to undo what would in effect be a *fait accompli*. In essence, this mimics the Imperial Japanese strategy of 1941–1942.<sup>27</sup>

To execute such a strategy, the PLA would seek to do the following:

- > In the opening minutes of a conflict, seek to render US and allied forces “deaf, dumb and blind” by destroying or degrading US and allied Low Earth Orbit (LEO) ISR, Space-Based Infrared System (SBIRS), third-generation Infrared System (3GIRS) sensors and communications satellites. This would be accomplished by employing directed-energy weapons, direct-ascent and co-orbital anti-satellite weapons, or terrestrial jamming, in concert with coordinated cyber and electronic warfare attacks;
- > Conduct ballistic missile salvo attacks, complemented by LACMs launched from various platform types, against US and Japanese air and naval bases. Attacks on Japanese targets could be supplemented by air strikes. Key targets would include forward air bases including those at Andersen, Kadena and Misawa; major logistics nodes such as Guam (airfields and port facilities); and key logistics assets such as fuel storage tanks. The PLA’s objective would be to deny US forces the ability to generate substantial combat power from its air bases in the Western Pacific;
- > Conduct major strikes using land-based anti-ship ballistic missiles (ASBM) and anti-ship cruise missiles (ASCM) launched from various platforms and submarines against all major US Navy and allied warships at sea within 1,500 nm of the Chinese coast, with particular emphasis on the maritime areas around the PRC’s littorals.<sup>28</sup> The PLA’s objective would be to raise the cost of the US and allied fleet operations within this “keep-out” zone to prohibitive levels (see Figure 4); and
- > Interdict US and allied sea lines of communication (SLOCs) throughout Southeast Asia and the Western Pacific. Nuclear submarines could patrol forward near Hawaii in the Pacific and Diego Garcia in the Indian Ocean to interdict the flow of supplies and reinforcements moving to forward bases; attack Navy assets transiting to and from operating areas in the Western Pacific; and force the Navy to divert substantial resources to convoy escort and anti-submarine warfare (ASW) in non-forward areas.

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<sup>27</sup> China, of course, will have a far greater supporting industrial and resource base than did Imperial Japan.

<sup>28</sup> See, for example, Andrew Erickson and David Yang, “On the Verge of a Game-Changer,” *US Naval Institute Proceedings*, May 2009, pp. 26–32, and Kraska, CDR, James, “How the U.S. Lost the Naval War of 2015,” *FPRI Orbis*, Winter, 2010, pp. 40–41.



**FIGURE 4. NOTIONAL “KEEP-OUT” ZONE**

Image: CSBA

## IMPLICATIONS FOR US STRATEGY & OPERATIONS

The postulated PLA forces and capabilities, coupled with writings calling for an operational approach that seeks to keep US forces, in particular, from intervening against any Chinese effort to conduct aggression or coercion against America’s allies and partners, could bring about a major shift in the Western Pacific military balance, with all its attendant negative consequences for peace and stability in the region. The most salient implications of this shift in the balance are discussed below.

## Consequences of Notional Large-Scale Attacks

As prosecuted over the last sixty years, the “American Way of Power Projection” typically comprises these key elements:<sup>29</sup>

- > Rapidly deploying substantial air, ground and naval forces to forward bases and littoral seas;
- > Creating rear-area sanctuaries for US forces and logistics build-ups;
- > Tracking enemy activities and denying same to the enemy;
- > Initiating combat operations at a time and place of US choosing;
- > Generating and sustaining large numbers of air sorties; and (more recently)
- > Activating complex battle networks and buying up satellite bandwidth.

Having enjoyed success with this approach for such an extended period of time, some US planners seem to take as a given uncontested air superiority, unimpeded flows of personnel and equipment to and within the theater of operations, the continuous availability of high-bandwidth unprotected satellite communications, and robust military and civilian logistics.

The postulated Chinese A2/AD capability described above would enable the PLA to conduct large-scale, theater-wide attacks that would severely challenge these assumptions. The consequences for US forces would almost certainly be substantially worse in the event of a pre-emptive attack, to include:

- > Loss of forward sanctuaries in physical domains;
- > Loss of sanctuaries in virtual domains (including space,<sup>30</sup> cyberspace, the electromagnetic (EM) spectrum), with all the implications this has for compromising US battle networks, to include communications, command and control (C2) and ISR connectivity;
- > Denial of access to areas of operations; and consequently
- > Loss of strategic and operational initiative.

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<sup>29</sup> See Alan Vick brief, “Does Chinese Military Modernization Threat the American Way of War?”, RAND Project Air Force brief, October 7, 2009.

<sup>30</sup> “Space” as used in this context refers to the information/data either provided by or relayed via on-orbit assets rather than the physical domain itself.

**FIGURE 5. CONTRASTING US AND PLA APPROACHES**

Key Elements of US Approach to Power Projection	PLA counters
Rapidly deploying air, ground and naval forces to forward bases and littorals	Employing air, surface and undersea attacks against deploying forces
Creating rear-area sanctuaries for US forces and logistics depots	Conducting air, cruise and ballistic missile attacks against forward US bases
Initiating operations at a time and place of its choosing	Initiating hostilities
Generating and sustaining large number of air sorties	Executing air, cruise and ballistic missile attacks against US airbases and aircraft carriers
Relying heavily on complex battle networks	Conducting anti-satellite, cyber and electronic warfare attacks

Source: CSBA

### *Loss of Sanctuary/Denial of Access in Physical Domains*

US ground, air and naval forces today are accustomed to operating from sanctuary. That is, the main operating bases, ports and facilities from which they are supported and resupplied have been largely invulnerable to serious conventional attack since World War II.<sup>31</sup> Either enemy forces have lacked the ability or reach to strike them accurately (aside from minor nuisance attacks), or US and allied defenses have been more than adequate to defend them. In this regard, Iraqi unguided ballistic missile attacks on Dhahran during the 1991 Gulf War were a harbinger. But in a scenario in which an adversary has large numbers of accurate guided weapons that can reach “rear areas,” maintaining sanctuary for either operations or logistical build-ups would be difficult, and perhaps infeasible, absent cost-effective defenses. The problem is particularly acute for fixed targets such as land bases and facilities.

The inability to use forward operating bases, including port facilities, has several important consequences:

- > Substantially reduced strike sortie rates due to the inability to concentrate large numbers of strike aircraft forward as a consequence of damaged or destroyed runways, fuel storage and transfer structures, and other support facilities;

<sup>31</sup> Of course, this would not have been the case in the event of an actual NATO-Warsaw Pact conflict.

- > Dramatically reduced maritime ISR and ASW patrol coverage due to longer transit ranges (i.e., flying from distant bases) and the correspondingly reduced on-station time;
- > Greatly increased demands and stress on the aerial tanker fleet;
- > Substantially reduced operational logistics throughput into the theater of operations; and
- > Significantly longer ship and submarine transit times to and from more distant resupply points for ordnance reloads, resulting in fewer available on-station naval strike platforms and munitions.

Navy surface and carrier aviation forces have long been accustomed to operating from sanctuary at sea, enabled by the near-absence of hostile long-range detection and targeting capabilities and capable enemy navies. Thus cruise missile-equipped surface ships and carrier tactical aviation could rely on launching attacks almost at will, untroubled by serious hostile threats. US carriers could easily approach well within the relatively short strike ranges of their current inventory of naval strike aircraft. However, the advanced anti-ship sensor and weapon systems China is now fielding and will certainly augment in the coming years will make it increasingly difficult for the US Navy to operate such ships effectively within adversary weapons ranges at acceptable levels of risk. Unfortunately, the ranges of future Chinese anti-ship threats are projected to be substantially greater than the effective range of US ship-based offensive strike weapons. Simply stated, the PLA's projected ability to attack ships accurately, and at extended ranges from the land, constitutes a threat that the US Navy has not experienced since World War II.<sup>32</sup>

Similarly, US sea lines of communication into combat theaters have been effectively unimpeded since 1945 and have not even been under threat since the demise of the Soviet threat to Atlantic convoys after the 1980s. However, as the Chinese naval order of battle increasingly includes longer-range submarines and long-range maritime strike aircraft, the Navy may have to allocate scarce resources to theater convoy escort tasks, and with a force structure that is both in demand for other missions and not ideal for the purpose.

The US Navy's submarine forces remain very difficult to detect. As previously noted, Chinese ASW capabilities remain rudimentary, and Chinese submarines

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<sup>32</sup> Of course, Soviet-era land-based bombers equipped with ASCMs posed a serious potential threat to US warships, but the Navy acquired substantial defensive capabilities designed to defeat such attacks, and in the event happily never had to use them. The British Royal Navy, on the other hand, suffered deadly attacks from relatively unsophisticated Argentinian land-based attack aircraft in the 1982 Falklands war.

are not assessed to have ASW as a primary mission at present. On the other hand, ASW is also becoming increasingly difficult even for the US Navy as newer classes of quiet diesel submarines of the kind employed by the PLA enter service.<sup>33</sup> The littoral areas within the First Island Chain are a particularly noisy undersea environment, further increasing the difficulty of detecting submarines by traditional means and methods. However, a new phenomenon is emerging in the scientific and commercial sectors, namely increased instrumentation of large undersea areas for the purpose of environmental monitoring, oceanographic research, and exploitation of offshore resources.<sup>34</sup> Arrays utilizing a range of phenomenologies, including active transmissions, may potentially provide sensor data exploitable for Chinese ASW purposes, particularly if such arrays were also linked to undersea weapons such as torpedoes and mobile mines.<sup>35</sup> Moreover, arrays connected to shore have considerable advantages in terms of power, communications and, most importantly, acoustic window size<sup>36</sup> over autonomous undersea vehicles (AUV) or assets operating via tethers from US submarines, which could provide significant advantages in relative performance. There is already evidence of Chinese instrumentation of significant littoral areas in the East and South China Seas. Separately, the potential for “acoustic jamming,” i.e., emitting sound energy into particular littoral areas to increase the background noise level above that of the submarine’s could make traditional US ASW efforts in littoral areas even more difficult.<sup>37</sup> If current trends continue, it is quite possible that US access to undersea areas within the First Island Chain could become far more risky, or at least that operational timelines for US undersea operations in the littorals could be considerably lengthened.

In the air domain, the US military has enjoyed undisputed localized air superiority if not outright supremacy since 1945. However, the fielding of sophisticated, dense integrated air defense systems (IADS) will increasingly challenge the

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<sup>33</sup> Air-Independent Propulsion (AIP) submarines have a much-reduced “indiscretion rate” than diesel-electric types. AIP submarines can operate for much longer periods without snorkeling, thereby greatly reducing the number of detection opportunities.

<sup>34</sup> For example, Japan’s ARENA (Advanced Real-time Earth monitoring Network in the Area) undersea network has cabled observing systems that can monitor a wide range of undersea natural phenomena over a wide area (linear arrays as long as 125 km; extensions into both the East China Sea and the Sea of Japan). See [http://homepage.mac.com/ieec\\_oes\\_japan/ARENA/ARENA-E.html](http://homepage.mac.com/ieec_oes_japan/ARENA/ARENA-E.html) for more information.

<sup>35</sup> It can be argued that the distinction between torpedoes, smart mobile mines, and unmanned undersea vehicles (UUV) carrying weapons or explosive charges is steadily narrowing.

<sup>36</sup> Acoustic window size determines the frequencies of underwater sound that a sensor can detect. The lower the sound frequency, the further it will travel, thus increasing the detection opportunities for ASW forces. Large seabed arrays with large acoustic window size thus have a real advantage over AUVs, since the latter are too small to deploy such arrays.

<sup>37</sup> Putting additional acoustic energy into what is already a noisy littoral undersea environment due to ambient noise and intense commercial activity would make it even more difficult for US submarines and other undersea sensors to detect hostile submarines. On the other hand, it could also reduce the risk of detection of US submarines.

ability of aircraft to penetrate into areas covered by such systems. Moreover, the vulnerability of forward air bases and the high risk of conducting carrier operations near the littoral while Chinese maritime area-denial threats remain operative suggest that the relatively short-ranged land- and sea-based tactical aircraft that comprise a large proportion of the US strike aircraft inventory would either require large-scale aerial refueling support or remain out of action.<sup>38</sup>

### *Loss of Sanctuary/Denial of Access in Virtual Domains*

US communications, ISR, and precision-guided munitions (PGMs) are heavily dependent on high-bandwidth connectivity for command and control, target detection, precision strike, and post-strike battle damage assessment operations over long ranges. This connectivity is highly dependent on long-haul space-based assets that have hitherto not been the target of attack except perhaps for occasional localized jamming. However, the PLA is demonstrating growing ability to jam or damage on-orbit assets, especially in LEO. In the future, it will likely have the ability to comprehensively deny or severely degrade US forces' theater-relevant space assets. Absent an ability to restore some measure of space functionality at least temporarily, and at times and in ways of its choosing, the US military could be driven to vulnerable airborne line-of-sight (LOS) networks and other suboptimal work-arounds.

As the PLA continues to field such capabilities, the United States may develop a commensurate capability to neutralize Chinese space assets. But in a notional "space war," wherein both sides systematically denied each other the use of space, the PLA would have asymmetric communications advantages, given its buried terrestrial fiber-optic connectivity, its ability to field airborne work-arounds based on its home territory and the shorter distances and smaller areas it would have to cover.

The PLA is developing a sophisticated cyber warfare capability. According to the Department of Defense, it is investing heavily in computer network operations capabilities and forces, and has established cyber warfare units tasked with preparing attacks on enemy computer networks.<sup>39</sup> Since 2005, the PLA has incorporated offensive cyber warfare into its exercises to conduct early non-kinetic strikes on enemy computer networks. President Hu has made cyber warfare a top funding priority, as reflected in the twelfth Five-Year Plan (2011–2015).<sup>40</sup>

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<sup>38</sup> For example, consider the multiple aerial refuelings F/A-18 aircraft flying from carriers in the northern Arabian Sea on missions over Afghanistan require today. The distances entailed in the Pacific theater would be considerably greater.

<sup>39</sup> Office of the Secretary of Defense, Annual Report to Congress: *Military Power of the People's Republic of China 2009* (Washington: Department of Defense, 2009), pp. 27–28.

<sup>40</sup> Wily Lam, "Beijing Beefs Up Cyber-Warfare Capacity," *Asia Times Online*, 9 February 2010, accessed at <http://www.atimes.com/atimes/China/LB09Ad01.html>.

Like strategic aerial bombardment, cyber warfare could extend well beyond the purely military realm, involving comprehensive attacks on financial, transportation and other US infrastructure.

Organizationally, the PLA General Staff's Fourth Department is currently tasked with cyber warfare. Some senior PLA officers also envisage the creation of a future "Cyber Command," akin to the PLA's Second Artillery Force, which today rivals the bureaucratic clout of the PLA Army, Navy and Air Force.<sup>41</sup> To man these new organizations, the PLA is aggressively recruiting "patriotic hackers." In summary, China is well on its way to developing comprehensive computer network operations that include:

- > Conducting peacetime access, reconnaissance and exploitation of enemy networks;
- > Implanting of trap-doors, Trojan Horses, or logic bombs that could be activated in the event of war;
- > Executing pre-emptive cyber attacks aimed at corrupting enemy information systems, communications, and databases;
- > Introducing false information into information networks as part of broader deception operations; and
- > Otherwise disrupting the effective use of information systems and networks by the enemy.<sup>42</sup>

Such non-kinetic attacks could be aimed at targets such as US command and control networks, ground control stations for satellites, or the US military-commercial logistical network. These capabilities suggest that "combat" in the cyber domain has the potential to become the future equivalent of World War II's constant struggle to break enemy codes and protect one's own, with the cracking of Enigma proving to be of strategic significance. It is surely not an exaggeration to suggest that an edge in cyber warfare could similarly prove decisive in a major conflict. Like strategic aerial bombardment, cyber warfare could extend well beyond the purely military realm, involving comprehensive attacks on financial, transportation and other US infrastructure.

A comprehensive discussion of cyber warfare is beyond the scope of this paper. However, assuming equal capabilities and competence on both sides, the effects would very likely be far more damaging to the US military than the PLA, given the former's heavy reliance on large volumes of information and data transmitted via classified and unclassified networks linking military and non-military systems into an array of networks. For example, in addition to its battle networks, a large proportion of the US military's logistics information and data flows over

<sup>41</sup> Idem.

<sup>42</sup> Lieutenant Colonel Timothy L. Thomas, US Army (retired), "China's Electronic Long-Range Reconnaissance," *Military Review*, November–December 2008.

other, non-battle networks, as the supplier base is heavily commercial. This could constitute a particularly serious weakness. Sustained disruption, corruption and denial-of-service attacks would have substantial impacts on US logistics support.

Since at least the Cold War's end, the US military has enjoyed dominance in electronic warfare across the electro-magnetic spectrum. Most recent foes have had such rudimentary electronic attack and defense capabilities that the Air Force and Navy have had little incentive to invest more heavily in this area, particularly in countering enemy use of electronic warfare. In the absence of a major challenge to its use of the electromagnetic spectrum, the US military has arguably fallen prey to the assumption that the connectivity underlying US power projection is robust and will always be there. Thus there has been inadequate planning or exercising of operations in denied or degraded connectivity environments.

### *Loss of Strategic and Operational Initiative*

Assuming China is developing and fielding the capabilities to conduct the types of preemptive kinetic and non-kinetic blows envisaged in its military's "Assassin's Mace" concept, it would gain both strategic and operational initiative from the outset. Moreover, "flexible deterrence operations" and other pre-conflict military activities US forces typically conduct during periods of heightened tensions may create substantial additional incentives for the PLA to preemptively strike, given the vulnerabilities of US forward forces and facilities to its postulated robust long-range precision-strike capabilities and the consequent opportunities to inflict substantial damage on US forces and bases. Yet failure to respond as expected to Chinese threats and provocations could undermine reassurance of US allies.<sup>43</sup> Unfortunately, these dynamics would work to decrease crisis stability by steadily undermining a stable military balance.

China would seek to achieve its strategic objectives and end hostilities as rapidly as possible before US forces could regroup and seize the initiative. Its military planning is predicated on achieving its objectives quickly in a "knock-out" blow before the United States could project sufficient effective military power into the theater to prevent it. After a major pre-emptive attack, China would seek to take advantage of initial US and allied losses and possible demoralization to consolidate its gains as rapidly as possible in the expectation that US and allied forces had been damaged sufficiently to preclude any rapid or effective near-term response, and that the American public would not support a prolonged war over

There has been inadequate planning or exercising of operations in denied or degraded connectivity environments.

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<sup>43</sup> This might be considered somewhat analogous to the dilemma President Roosevelt faced in shifting the Pacific Fleet's main battle force forward to Pearl Harbor in mid-1940. The move was intended to deter Japan from exploiting Britain's dire position following the fall of France and the Netherlands by threatening to overrun French and Dutch colonial possessions throughout Southeast Asia while cutting off supplies going to China via the Burma Road. However, it rendered the fleet far more vulnerable to devastating pre-emptive attack, as was dramatically demonstrated in December 1941.



**The short war paradigm that permeates contemporary US military thinking about major combat operations would be utterly irrelevant in this context.**

ostensibly insufficient stakes.<sup>44</sup> If the United States continued to fight, the PLA's main post-attack objective would be to prevent US forces from seizing the strategic and operational initiative by continuing attacks on allies while striving to prevent US forces from conducting their own offensive operations.

Ironically, while China would seek a rapid end to hostilities, the short war paradigm that permeates contemporary US military thinking about major combat operations (as opposed to irregular warfare) would be utterly irrelevant in this context. The postulated future difficulty in penetrating the developing Chinese A2/AD system, coupled with the vast transit distances in the Western Pacific, virtually ensures that there could be no short, even if limited, war with China if the United States chose to fight.

### **Vulnerability of Key Allies**

The defense of Japan remains a strategic and operational imperative of the first order. Japanese Self-Defense Forces (JSDF) have substantial air and naval forces that could augment US forces in selected mission areas, to include submarine- and air-based ASW, maritime ISR, maritime strike and ballistic missile defense. Still, the major US operating bases and facilities, e.g., air bases on Okinawa (Kadena AFB) and Iwakuni, and the naval base at Sasebo, are all within easy striking range of Chinese missiles and strike aircraft, as are many JSDF bases in western Japan.

The defense of Taiwan against Chinese attack is already problematic today, given the large ballistic missile force that can strike Taiwan, the quantity and quality of PLA air and naval forces that can strike approaching US naval forces, and the potent IADS that could make US air operations over Taiwan and the Taiwan Strait very costly. Moreover, the large Chinese fighter force, composed increasingly of fourth-generation aircraft, vastly outnumbers what US forces could sustain in terms of aircraft numbers, sortie rates, and mission duration. Even assuming extremely high probabilities of kill (Pk), US Advanced Medium-Range Air-to-Air (AMRAAM)-armed stealth fighters would find it extremely difficult to overcome their quantitative inferiority during the critical early days of a conflict that occurs with little or no warning.<sup>45</sup>

<sup>44</sup> This, of course, is the classic question of fight or flight: would the United States rise up in righteous wrath as after Pearl Harbor, or would it conclude that the prize was not worth the cost as after the 1983 Beirut bombings? Much would depend on Chinese evaluation of likely American responses in such a future situation. To the extent that a rising, self-confident China believed the United States to be a declining power, the danger that it would conclude the US government and public would not have the stomach for such a fight would steadily grow.

<sup>45</sup> John Stillion and Scott Perdue, "Air Combat Past, Present and Future," RAND Project Air Force briefing, August 2008.

Similarly, the defense of the Republic of Korea in the unlikely event of a Chinese (as opposed to North Korean) attack would be difficult as well for many of the same reasons that apply to the Taiwanese case. It would be compounded by the fact that the PLA ground forces could have land access to South Korea via the Democratic People's Republic of Korea (DPRK).

## Broader Consequences

While the favorable, stable military balance that has existed in the Western Pacific for the last two decades is deteriorating, with major consequences for the US military's ability to project power into the region, neither DoD's planning nor its defense program have been significantly modified to account for this fact. Thus the Defense Department continues to emphasize investments in short-range rather than long-range strike systems; in unprotected communications satellites; in elaborate battle networks vice training under denied or degraded battle network conditions. It also continues to under-invest in penetrating, long-endurance ISR and strike capabilities, aerial tankers, forward base hardening, the combat logistics force (CLF) and directed-energy weapons for missile defense.

The US military is steadily losing its near-monopoly in the precision-guided munitions and robust battle networks that have underpinned its dominance. The PLA is leveraging the widespread diffusion of military technology, an increasingly skilled and educated manpower base and dramatically larger budgets to field long-range precision strike systems and munitions in ever-greater numbers. Coupled with the growth of PLA C2 and ISR battle networks, they will constitute the heart of China's A2/AD forces.

As this occurs, the current and projected US force structure will be compelled to pay an increasingly high — and perhaps prohibitive — price should Washington attempt to conduct traditional types of power-projection (or even forward presence) operations within China's A2/AD threat rings. The workhorses of traditional US power-projection operations, to include the short-ranged land-based and naval strike aircraft that comprise the bulk of current and projected US air strike assets, amphibious forces, and large non-stealthy strike and support aircraft will likely find themselves either sitting on the sidelines in the early stages of a conflict, or suffering high levels of attrition. In either case, their deterrent value will have declined precipitously.

If the ability to deter and defend forward were lost, the US Pacific Command's overall theater military strategy would have to change fundamentally. As noted above, a Sino-US conventional conflict likely would devolve into a prolonged war. To avoid encouraging Beijing from believing it could prevail in a protracted conflict, the US military would need to plan and be prepared to execute a "distant

If the ability to deter and defend forward were lost, the US Pacific Command's overall theater military strategy would have to change fundamentally.

blockade.<sup>46</sup> Success in an extended conflict may also rest on the US military's regaining access to forward bases and maritime areas in order to reverse the gains of Chinese aggression. This would require reducing the most important elements of the Chinese A2/AD system, including the destruction of selected production facilities (e.g., ballistic missiles). To this end, the United States' ability to mobilize key parts of its own defense industrial base, particularly those concerned with volume production of long-range precision-guided munitions, will likely be a critical factor in its success or failure in the conflict.<sup>47</sup>

### Critical Problems, Competitions and Asymmetries

Developing an AirSea Battle concept requires identifying and examining the key competitions between particular kinds of US forces and the PLA A2/AD offensive and defensive battle networks. It is only by understanding these key competitions, or interactions, that it becomes possible to assess how the US military might sustain or regain adequate freedom of action in the face of the PLA's efforts to deny it the same.

The following operational competitions appear most critical to operational success or failure:

- > Battle network versus counter-battle network;
- > Missile attack versus missile defense;
- > Air superiority versus air defense;
- > Sea (and undersea) control versus sea (and undersea) denial; and
- > Force sustainment versus counter-force sustainment.

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<sup>46</sup> By way of historical analogy, in the years before World War I, the British Royal Navy realized that newly developed German Navy "anti-access/area-denial" weapons of their day, such as torpedo boats and submarines, rendered its previous doctrine of "close blockade" obsolete. During the war, it instead implemented a "distant blockade" that effectively cut off German overseas trade, which ultimately contributed greatly to Imperial Germany's eventual defeat.

<sup>47</sup> Every major combat operation since the 1973 Yom Kippur war has seen a far higher than expected expenditure rate for precision-guided munitions. Given 1) ordnance accounts are generally early "go-to" sources for funds when defense budgets tighten, 2) the high cost of most precision-guided munitions, and 3) fears of block obsolescence, the Services have tended to keep overall inventories relatively small. As an example, the US Navy maintains perhaps 1.5 ship fills (the total inventory of weapons divided by the number of fleet-wide cells that can carry them) worth of Tomahawk cruise missiles. Eventual unit costs will be a function of quantities ordered, but they will undoubtedly remain considerable. Thus in a major conflict, expenditure rates on both sides could be expected to be quite high, which would make the comparative ability to replenish inventories over the course of a prolonged conflict an important planning factor.

### *Battle Network versus Counter-Battle Network*

The battle network versus counter-battle network competition has two aspects: maintaining US and allied networks in operation despite hostile efforts to destroy, degrade or exploit them; and countering US efforts to destroy, degrade or exploit the PLA's networks.

**SPACE ACCESS VERSUS SPACE DENIAL.** Satellites provide ISR such as imagery and electronic intelligence; precision navigation and timing via the Global Positioning System; and global military communications. Over time, US military forces have become heavily dependent on these space services for theater operations and power projection, particularly the large bandwidth capacity that satellite communications confers, which allows a tremendous amount of data and information to flow between forward units and rear entities. Not surprisingly, US planning and combat operations tend to consume large amounts of bandwidth.

China, by contrast, while increasingly a space player, is far less dependent on space systems for C2 than is the United States, and there is no compelling need for the PLA to become significantly more reliant on satellite communications in the coming decade, and thereby forfeit a key source of competitive advantage over the United States. For operations in the Western Pacific, the PLA's command-and-control network can remain heavily land-based, with key components hardened and buried. Its multi-faceted maritime ISR capabilities include over-the-horizon radars, large numbers of ISR UAVs, space-based ocean surveillance systems, naval and air maritime patrol assets, and commercial surface vessels operating in littoral waters that can provide maritime domain reporting *en passant*.<sup>48</sup>

US military forces are heavily dependent on space systems for critical functions besides C2 and ISR. Global Positioning System (GPS) satellites provide precision navigation for platforms and, importantly, locational data for a large proportion of the total US precision-guided munitions inventory. They also provide precision timing, which is critical for the proper functioning of networks. One other key role enabled by on-orbit assets is managing data transmission and command and control signals to and from UAVs. The current UAV reliance on satellite communications could become a source of vulnerability unless new atmospheric communications architectures can be fielded as back-ups,

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<sup>48</sup> As an historical example, Japanese fishing trawlers hundreds of miles out to sea provided Tokyo with its first and only warning of the Doolittle Raiders in April 1942. The Doolittle Raid was an audacious effort to strike back at Japan using land-based Army B-25 bombers launched from an aircraft carrier, with the bombers flying on to bases in China after completing their bombing runs. The task force hoped to close within 400 nm of the Japanese mainland before launching to give the bombers their best odds of mission success, but its sighting by the trawlers forced a premature launch while still over 600 nm out. While the objectives of the raid were accomplished, all the aircraft were subsequently lost as a consequence of insufficient fuel because of the extra flying distance. Fortunately, most of the Raiders survived. See <http://www.history.navy.mil/photos/events/wwii-pac/misc-42/dooltl.htm>.

or UAVs that are far more capable of conducting autonomous ISR or strike missions can be developed.

Given the inherent vulnerability of unprotected space systems, the potent anti-space capabilities the PLA is investing in and could acquire in the coming decade, and the US military's high dependence on space systems, China might find denying US forces the use of space a highly attractive proposition, even at the cost of losing its own access to space. On the other hand, China might be relatively more dependent on its own space systems, particularly in the early hours of war, for support in locating and destroying key enemy systems. In that limited context where blinding China's ISR may be critical to blunt its attack, the advantage may lie with the United States.<sup>49</sup>

China might find denying US forces the use of space a highly attractive proposition, even at the cost of losing its own access to space.

**MAINTAINING C2 AND ISR CONNECTIVITY.** The Chinese would almost certainly enjoy an advantage in “work-around” efforts to offset the loss of space functionality. There are two generic work-arounds available to each side: robust space reconstitution capacity (e.g., Operationally Responsive Space (ORS)); and airborne line-of-sight networks employing various platforms equipped with sensors and/or communications and data relay capability. Owing to its positional advantage, China has additional options not available to the United States, such as shifting to buried fiber-optic terrestrial communications networks to preserve connectivity.

Compared to a Chinese land-based buried fiber-optic network, a US ORS capability is far more expensive to field, and more importantly, considerably more vulnerable to the same types of attacks that resulted in the prior loss of space functionality. Moreover, the PLA's airborne networks, mostly UAV-based, would need to cover considerably smaller areas fanning out from the Chinese coast than the great distances that their US counterparts would have to cover, particularly for long-haul communications purposes to distant command echelons, as well as lengthy transit times to and from station that would reduce on-station endurance, thereby necessitating considerably larger numbers of airborne assets to create and sustain the required number of stations or orbits.<sup>50</sup>

To the extent such airborne platforms were non-stealthy, they would likely require some form of defense. In providing escorts for airborne ISR platforms, once again the PLA could leverage its positional advantage to draw upon land-based defense assets from dozens of bases. The US escorts, on the other hand, would have to be launched from distant bases or naval combatants outside the

<sup>49</sup> Attacks on each side's space early warning systems would have an immediate effect on strategic nuclear and escalation issues. However, this issue lies beyond the scope of this paper and is therefore not addressed here.

<sup>50</sup> Some US UAVs might be launched by submarine. However, given the high demand for US submarines in AirSea Battle, and their relatively limited payloads, their contribution to sustaining an airborne C2 and ISR force would likely be quite limited.

PLA's A2/AD threat rings, traveling long distances with concomitant demands on aerial tankers.

**CYBER ATTACK VERSUS CYBER DEFENSE.** The cyber competition will be offense-dominant for the foreseeable future. It will be cheaper and easier to attack information systems than it will be to detect and defend against attacks. In this sub-competition China might have the initial advantage, assuming that it enjoys the advantage of striking first, and at a time and place of its choosing. The character of the US warfighting complex, incorporating as it does globally distributed elements both military and commercial, allows a greater range of potential cyber access points for intruders. Spread across disparate information networks, the various US networks—both for combat and support purposes—may prove difficult to defend against a determined cyber attack. Cyber defense may be easier for China, relying as it does on more closed information systems and buried fiber-optic communications that are relatively difficult to access. That said, both sides are likely to emphasize offensive cyber operations. The advantage may rest with the side that can best integrate offensive cyber operations with other kinetic forms of attack.

**ORGANIZATIONAL IMPEDIMENTS.** Lastly, the Air Force and Navy suffer from a self-inflicted connectivity wound: they currently acquire and operate weapons, sensors, and communication systems that are often incompatible with one another. As an illustrative example, Navy forces are completely unable to use the Air Force's Digital Common Ground System (DCGS).<sup>51</sup> While there has been some attention paid in recent years to greater interoperability (especially regarding common operating pictures, and communications and data link protocols), information, intelligence, and data flows are often highly "stove-piped," not only between the two Services, but also within them.

### *Missile Attack versus Missile Defense*

The core elements of US and projected Chinese long-range precision strike (LRPS) differ strikingly. Whereas US conventional strike is heavily based on manned land- and sea-based bombers and strike fighters, plus distributed land-attack cruise missiles, the PLA long-range strike systems are primarily land-based ballistic missiles, including anti-ship ballistic missiles, complemented by anti-ship and land-attack cruise missiles launched from aircraft, ships or submarines. Most PLA land-based ballistic and cruise missiles would be launched

The core elements of US and projected Chinese long-range precision strike differ strikingly.

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<sup>51</sup> The Air Force's network-centric Distributed Common Ground System of ground stations, distributed sites, collaborative work centers, and remote sites produce strategic, operational, and tactical intelligence supporting combat operations. See [http://www.dvidshub.net/?script=news/news\\_show.php&id=41270](http://www.dvidshub.net/?script=news/news_show.php&id=41270).

from mobile Transporter Erector Launcher (TEL) vehicles, which compounds the difficulty of finding and attacking them.

Given these different LRPS architectures, their strengths and weaknesses also will be asymmetrical. The effectiveness of US LRPS depends heavily on strike aircraft being able to reach their weapons release points successfully, which for many targets could require penetrating into China while avoiding or degrading robust integrated air defenses. To the extent that many US launch platforms can be kept beyond their effective range by Chinese A2/AD forces, the number of successful strikes would be greatly reduced. The PLA's efforts are made all the more effective as the US defense program finds the bulk of the most stealthy US strike aircraft will be relatively short-ranged late-generation strike fighters carrying very small payloads of guided munitions, while US bombers, with their much greater payloads, are unlikely to be able to penetrate the PLA's robust IADS systems without considerable risk of loss. Thus bombers will likely be limited to standoff attacks employing very expensive missiles that, despite their cost, are not particularly effective against mobile or hard and deeply buried targets.

The PLA LRPS architecture enjoys another major advantage in that its ballistic missiles have short times-of-flight, which greatly reduces US and allied warning time, making them very difficult and expensive to defend against. The timelines entailed in a large-scale missile strike campaign could be compressed, possibly measured in only a few days to create shock effect and to enable the PLA to seize its objectives rapidly. The overall objective would be to demoralize the United States and its allies by the speed of China's victory and the high cost of attempting to reverse it.<sup>52</sup>

Ballistic missile defenses currently employ primarily kinetic-kill interceptors whose cost typically exceeds by a wide margin the cost of the offensive systems they are meant to defend against.<sup>53</sup> Moreover, owing to their high cost, the number of interceptors available to defend any particular target is likely to be very limited, making such targets vulnerable to saturation attacks. Benefiting from China's interior lines, a single PLA long-range ballistic missile could be used to hold at risk multiple targets over a wide area, while defenses against such attacks, having far less range, must either be concentrated to protect a small number of targets or be distributed in small numbers to cover a larger target set. Many of

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<sup>52</sup> Again by way of historical analogy, consider Pearl Harbor and the rolling Japanese onslaught in Southeast Asia in early 1942. See, for example, Samuel Eliot Morrison, *The Rising Sun in the Pacific*, History of United States Naval Operations in World War II, Vol. 3, (Little, Brown & Company: Boston, 1948).

<sup>53</sup> For example, Patriot PAC-3 missiles cost about \$2 million per round, while the "cheaper" Air-Launched Hit-to-Kill (ALHK) round, which is a proposed fighter-carried modified AMRAAM, is advertised to cost just under \$1 million per round. Note, though, that the cost of individual rounds is just a small fraction of overall BMD costs. In retrospect, foreign development and fielding of conventional ballistic missiles has proven to be an effective cost-imposing strategy on the US military.

the offensive missiles would likely carry decoys, further straining the defense. Thus ballistic missile offense is likely to dominate ballistic missile defense for the foreseeable future, absent technological breakthroughs in non-kinetic defenses.<sup>54</sup>

Figure 6 shows current estimated PLA ballistic missile inventory sizes. Given current build rates, by the 2020s the PLA ballistic missile inventories are likely to number in the thousands. A force of this size could, in and of itself, create a significant shift in the Western Pacific military balance. To support its efforts to force Taiwan and/or Japan into submission before large numbers of US reinforcements could be brought to bear effectively, the PLA can be expected to conduct large-scale missile attacks on US forward operating bases and facilities to put—and keep—them out of action.<sup>55</sup> The PLA's large missile forces would enable it to retain a sizeable reserve.

<sup>54</sup> Andrew Krepinevich, *The Quadrennial Defense Review: Rethinking the US Military Posture* (Washington: CSBA, 2005), p. 18.

<sup>55</sup> The implicit assumption is that the PLA would strike US forces based in or operating from Japan. Since this would most likely bring Japan into the war, it seems plausible that an early Chinese objective would be to force Japan to submit as quickly as possible. Were China to succeed in keeping Japan neutral, the need for the United States to expend resources in its defense would correspondingly disappear.

**FIGURE 6. ESTIMATED PLA BALLISTIC MISSILE TOTALS (2010)**

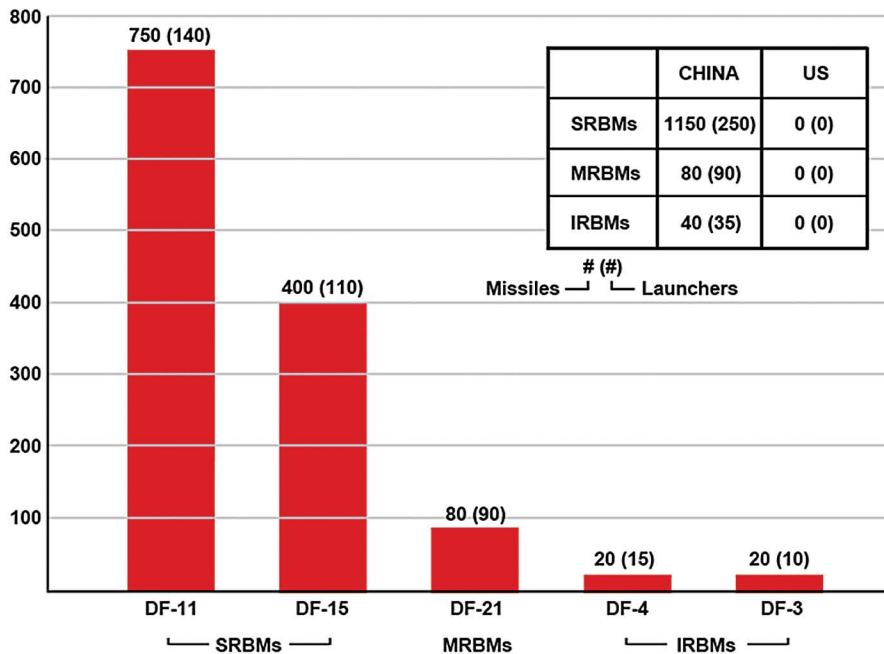


Image: CSBA

Source: Department of Defense, Office of the Secretary of Defense, *Annual Report to Congress on the Military Power of the People's Republic of China*, 2009, p. 66, accessed at [http://www.defense.gov/pubs/pdfs/China\\_Military\\_Power\\_Report\\_2009.pdf](http://www.defense.gov/pubs/pdfs/China_Military_Power_Report_2009.pdf), on 24 March, 2010.



The best way to defend against missile attacks is to destroy them through counterforce operations before they are launched — “kill the archer, not the arrow.”

On a more favorable note, unlike US long-range strike aircraft, which can be reloaded with precision weapons upon returning to base, once a PLA missile is fired, it is permanently expended, as is the case with any other munition. Thus, the PLA missile force could be seen as a “wasting asset” as missiles are expended. A key indicator of China’s military intentions — and its military capability — may be seen in its ballistic missile production rate.

Inducing the PLA to expend its offensive missile inventories in ways that are unproductive militarily from the Chinese perspective is key to an effective allied defense. Seen this way, one can conceptualize a “competition” between the PLA’s relatively scarce supply of offensive missiles and its view of the US and allied target set.

Missile defense has both offensive and defensive elements. The best way to defend against PLA missile attacks is to destroy them through counterforce operations before they are launched. In other words, “kill the archer, not the arrow.” However, this is an extremely challenging task, given several factors: the mobility of Chinese ballistic and cruise missile launchers, which makes finding and rapidly striking them particularly difficult; the sophisticated PLA IADS defending these missiles that must be dealt with or avoided; and the sheer numbers of PLA missiles and TELs. The key enabler for hitting such targets is the persistent presence of airborne sensors and weapons platforms. To maintain the persistent presence needed to destroy or suppress the PLA missile forces, US systems must be able to survive in contested air space and have the appropriate sensors, ordnance and connectivity. Given the threat to US and allied forward bases until this mission is accomplished, the initial efforts will need to be undertaken by aircraft possessing extended range and endurance.<sup>56</sup>

Yet even if the US and its allies possessed these capabilities, owing to the sheer numbers of PLA missiles and the large area over which they might hide, it seems highly unlikely that they could destroy more than a small fraction of them. These offensive air operations, however, could disrupt PLA missile command and control networks, launch operations, and launcher replenishment. Put another way, the principal value of the offensive campaign against the PLA’s missiles is likely to center on their suppression rather than their destruction. If a significant level of suppression is achieved, it may limit the PLA’s ability to fire its missiles in optimum salvos. This could greatly ease the task of US and allied forces engaged in missile defense, presenting them with a “drizzle” of PLA missiles rather than a “downpour.”

<sup>56</sup> For an analysis of the difficulties of doing persistent operations in defended airspace at extended range see Thomas Ehrhard and Robert Work, *Range, Persistence, Stealth, and Networking: The Case for a Carrier-Based Unmanned Combat Air System* (Washington, DC: Center for Strategic and Budgetary Assessments, Washington, DC, 2008).

Under AirSea Battle, US defenses against PLA missile attacks would vary depending on whether the targets were fixed or mobile. With respect to the former, defensive actions include:<sup>57</sup>

- > Employing active missile defenses to thin raids;
- > Hardening key land-based assets (e.g., air fields) to increase the number of missiles required to destroy a target at a particular confidence level and/or increasing the required lethality of the missile payload (thereby forcing the use of unitary warheads in place of sub-munitions);
- > Proliferating the number of targets (i.e., base diversification);
- > Generating false targets (e.g., through decoys, deception or spoofing); and
- > Rapidly repairing the damage sustained in attacks.

Neutralizing Chinese ISR is less relevant in defending fixed targets since their location will remain known. However, the PLA must still conduct battle damage assessments following strikes on fixed targets to determine the need for follow-on attacks or to determine optimal times to strike (e.g., hitting especially valuable aircraft such as stealth bombers or specialized surveillance platforms when temporarily on the ground and vulnerable). Should the PLA lose its ability to conduct effective BDA, it could be forced to expend its valuable missile assets in significantly suboptimal ways, thereby advantaging the defense.

For mobile targets — primarily major surface warships — within missile range, preventing the PLA targeteers from detecting and classifying targets could be critical to the latter's survival. Blinding, spoofing or otherwise negating PLA C2 and ISR capabilities would be essential to an effective defense, as missiles can reach their target much faster than the target can escape the enemy's "sensor windows." Active sea-based missile defense systems could attrite some incoming missiles but would be subject to magazine exhaustion given their limited supply, some of which might be expended against various decoys and/or other threats such as cruise missiles or strike aircraft.<sup>58</sup> The extremely high cost of kinetic interceptors strongly suggests that this situation will not — and should

Under AirSea Battle, US defenses against missile attacks would vary depending on whether the targets were fixed or mobile.

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<sup>57</sup> For a good discussion of active and passive base defense measures, see John Stillion and James Perry, "Emerging Threats to US Bases in the Western Pacific," Northrop Grumman Corporation brief, September, 2009.

<sup>58</sup> Such threats could also be apparent as opposed to actual. For example, relatively cheap UAVs or older remotely piloted aircraft could be sent out in large numbers to proliferate apparent targets that would have to be quickly identified as non-threats or else taken under fire "just in case."

not — change.<sup>59</sup> Ships exhausting their magazines would be compelled to leave the theater to rearm since VLS tubes cannot currently be rearmed at sea. These ships would be out of action for weeks given the need to transit to and from rear areas, further disadvantaging the defense.

Another important defensive measure would be to proliferate false targets to “thin” the PLA inventory of ASBMs. By increasing PLA targeter uncertainty as to which targets were real and which were not, through the use of various operational deception techniques, could significantly increase PLA missile expenditure rates, as all targets might have to be attacked to ensure that the real high-value targets were destroyed.

Determining the appropriate degree of hardening selected bases in the theater, particularly Guam, to deter or complicate Chinese attacks is difficult. Proponents assert that hardened bases significantly increase the number of missiles required to put them out of action for a prolonged period. Moreover, they argue, failing to harden bases could reduce crisis stability by incentivizing the PLA to attack first, before expensive forward-deployed air assets could be dispersed.<sup>60</sup> The principal disadvantage of base hardening is the high cost of doing it sufficiently well to protect key facilities such as large aircraft hangars, fuel system components and piers.

AirSea Battle envisions integrating all aspects of missile defense to defeat the PLA’s plans to win a quick victory. If successful, it can contribute significantly to maintaining a stable military balance in the Western Pacific region to the benefit of all, including China. AirSea Battle’s integrated missile defense concept will be elaborated upon in the next chapter.

### *Air Superiority versus Air Defense*

As the PLA’s A2/AD architecture matures, the ability to penetrate into Chinese airspace to strike selected high-value targets will be increasingly challenged. Given current trends, by the 2020s, the PLA’s IADS would likely include sophisticated components such as fifth-generation fighters and S-300/400 SAM systems with ranges of hundreds of kilometers. These defenses would be concentrated along China’s coastal areas, and could pose a serious threat to the US military’s ability to conduct penetrating long-range precision strike operations, especially if the Defense Department executes its current Program of Record.

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<sup>59</sup> The situation should not change in that the United States and its allies should not allow themselves to be drawn into a competition with the PLA in which the former expend enormous resources to expand their expensive kinetic-kill interceptors while the latter produces additional ballistic missiles to offset the defenders’ efforts at a fraction of the cost.

<sup>60</sup> In recent discussions allied representatives suggested that failure to harden its Western Pacific bases would be interpreted by some in the region as an indicator of weakening US interest in the region, thereby affecting regional actors’ longer-term security calculus.

Owing to the asymmetry between Chinese and US long-range precision-strike capabilities in the Western Pacific theater, as noted above, the PLA's central air defense problems are significantly different from those confronted by US missile defenses. Currently, the PLA must deal with the classic air defender problem of detecting, tracking and intercepting air platforms (including cruise missiles) that are capable of at best supersonic sprint speeds for relatively short periods, while US military forces must also defend against large numbers of ballistic missiles.<sup>61</sup> Thus PLA air defenders are not confronted with the problem of defending against this class of weapons. In short, US forces at present lack the ability to conduct prompt non-nuclear strikes against critical time-sensitive targets or critical targets situated well inland.

PLA air defenders would still confront some of the same problems faced by their US counterparts. Their SAMs, while quite numerous, will still be "scarce resources" in the sense that they could be vulnerable to saturation attacks supported by employment of plentiful decoys and other operational deception techniques to proliferate "false targets." Moreover, to present a solid defense against next-generation US stealthy air platforms, the PLA would have to substantially increase the density of its air defense network, an expensive proposition. The PLA SAM sites and their associated C2 networks could also be vulnerable to direct kinetic or non-kinetic attack, or rendered ineffective by long-range penetrating airborne electronic attack (AEA), although the SAMs' launchers' mobility makes it difficult to attack them, especially when they are not emitting.

The PLA air defense problem would be further stressed if it were forced to defend its entire border, rather than concentrating its efforts mainly on China's maritime frontier. If US forces possessed a significant long-range strike capability, thereby enabling them to penetrate China's borders from all directions, then PLA air defenders would be compelled to either thin out their defenses in the Western Pacific, divert substantial resources to defending other regions, or accept significantly greater vulnerability along undefended areas.

### *Sea (and Undersea) Control versus Sea (and Undersea) Denial*

In both the surface and undersea domains, AirSea Battle's twin objectives are to secure US and allied access while denying the PLA the same.

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<sup>61</sup> The US military is constrained by the Intermediate Range Nuclear Forces (INF) Treaty from fielding any ground-launched ballistic missiles with ranges between 500 and 5,000 kilometers. US naval forces are not currently armed with conventional ballistic missiles. Interestingly, in 2007, Russian president Putin stated publicly that adherence to the INF Treaty was no longer in Russia's interest. This suggests that termination of the Treaty by mutual agreement may well be possible if both sides deem it advantageous. See <http://www.armscontrol.org/factsheets/INFtreaty>.

The projected PLA anti-ship ballistic missile capability is clearly the most dramatic emerging threat to US Navy operations in the Western Pacific.

**SURFACE OPERATIONS.** The projected PLA anti-ship ballistic missile capability is clearly the most dramatic emerging threat to US Navy operations in the Western Pacific.<sup>62</sup> However, the PLA is developing other capabilities to deny the US Navy's surface fleet access to large parts of the Western Pacific at acceptable levels of risk.

To complement its land-based over-the-horizon radars, the PLA is projected to field robust maritime ISR platforms, including stealthy high-altitude, long-endurance (HALE) ISR UAVs, and space-based maritime ISR assets.<sup>63</sup> Fielded in significant quantities, these assets should give the PLA excellent maritime domain awareness, certainly within the First Island Chain and likely well beyond it. This capability will provide long-range anti-ship cruise-missile-carrying platforms with remote targeting data, further increasing the threat from PLA anti-ship cruise missiles, launched from a variety of air, surface and submarine platforms, to US warships.

The PLA's sizable submarine force can be expected to conduct anti-surface warfare, employing anti-ship cruise missiles against high-value US surface warships such as aircraft carriers. ASCM-carrying bombers constitute a longer-range threat. Within the First Island Chain, shorter-range strike fighters with maritime strike capability, and surface warships, including numerous missile craft, would also carry ASCMs. With the density of cruise missile and other precision-guided anti-ship munition threats increasing as the distance to the Chinese mainland decreases, efforts to thin out these capabilities would be an important element of neutralizing the PLA A2/AD threat.

**UNDERSEA OPERATIONS.** AirSea Battle's undersea operations center on two missions. The first is defeating the offensive PLA submarine threat to US and allied surface forces, auxiliaries, and friendly merchant ships, as well as the threat posed to selected US and allied targets on land by any PLA submarines armed with land-attack cruise missiles. The second is countering PLA threats to US submarines operating within the First Island Chain.

ASW is becoming increasingly difficult, even for US ASW forces, due to the very low signatures of the modern conventionally powered submarines that the PLA is expected to have in significant numbers by the early 2020s. While US ASW assets will provide some localized defense (i.e., against submarines operating within torpedo range of naval formations operating in the open ocean), it will

<sup>62</sup> For a notional, if not necessarily realistic, depiction of how a fielded ASBM capability could change future US naval operations, see Andrew Erickson and David Yang, "On the Verge of a Game-Changer," *US Naval Institute Proceedings*, May 2009, p.26–32 and James Kraska, "How the United States Lost the Naval War of 2015," *Naval War College Review*, Winter 2010, p. 35–45.

<sup>63</sup> Department of Defense, Office of the Secretary of Defense, *Annual Report to Congress on the Military Power of the People's Republic of China, 2009*, pp. 23–26.

be difficult to assure high probability of detection of all PLA submarines within the weapons-release range of their long-range anti-ship cruise missiles.

Interrupting the receipt of targeting information to PLA submarines would clearly aid the defense. However, even denied such information, the submarines would remain threats as long as they remained on patrol since they could still locate and target US forces using their own visual, sonar and electronic intercept sensors.

To reduce that threat over time requires a systematic ASW campaign combining the destruction of those Chinese submarines on patrol and denying those in port access to the sea. Submarines are generally most vulnerable transiting in and out of their bases.<sup>64</sup> Moreover, diesel submarines have much less endurance than do their nuclear counterparts, thus they would need to return to port to resupply fairly frequently. These transits would provide potential engagement opportunities for US submarines. Deploying smart mobile mines might prove particularly effective in attriting PLA submarines and/or blocking them from access to their bases.

An attrition campaign would likely take months to materially reduce the submarine threat. Moreover, China could exploit its long coastline with its numerous bases and ports to diffuse US and allied ASW efforts. Thus an effective ASW campaign would likely take months and require considerable resources, principally US SSNs.

The Chinese undersea threat also involves deploying undersea systems to provide significant undersea situational awareness. As noted earlier, integrated sensor and weapon arrays could pose significant threats to US submarines. At the least, they could force substantial lengthening of the operational timelines required to complete various missions and tasks as submarines would have to proceed much more cautiously. At worst, they could effectively deny significant undersea areas to US and allied submarines. Consequently, AirSea Battle accords high priority to neutralizing these undersea networks early in a conflict to enable US undersea operations, including the swift prosecution of the ASW campaign.

Countering such Chinese systems in a timely manner would entail a high degree of pre-war “intelligence preparation of the undersea battlespace” to include recurrent, comprehensive mapping of the PLA’s undersea systems. Such mapping would, however, be resource-intensive. While some of this could be done by UUVs,<sup>65</sup> significant submarine missions would be required. Given the large

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<sup>64</sup> On the premise that China initiated the conflict, all its functional submarines would presumably have left port and proceeded to their assigned patrol areas well before hostilities commenced. However, they would need to return to port periodically for refueling and rearming.

<sup>65</sup> Civilian UUVs are already doing substantial wide-area hydrographic and oceanographic research for commercial and scientific purposes. Some of their systems and technologies have military applications.

expanses within the First Island Chain, the specific areas and levels of effort invested would need to be carefully prioritized.

### *Force Sustainment versus Counter Force Sustainment*

There are three separate issues that must be addressed with respect to AirSea Battle and force sustainment: force structure and capacity constraints; payload and global inventory constraints; and operational logistics and sustainment issues.

**FORCE STRUCTURE AND CAPACITY CONSTRAINTS.** Given the current US force structure and defense program, projected US forces by the next decade would almost certainly be insufficient to preserve a stable military balance and maintain a high degree of deterrent capability against the kind of PLA capabilities and operations presented above.<sup>66</sup> In particular, the US and its allies would likely suffer from significant shortages of submarines, maritime patrol aircraft, long-range penetrating bombers, aerial tankers, ballistic missile defenses, survivable satellites, robust battle networks, autonomous unmanned systems, and escort ships.<sup>67</sup> Of course, a weak deterrent invites not only aggression but coercion. It also serves to weaken the confidence of American allies in US security guarantees.

In various analyses of potential future conflict, submarines typically are over-tasked to conduct strikes (independently or in support of other missions), ISR, Special Forces infiltration and exfiltration, ASW (including offensive mining), and ASUW concurrently. Some speculate that in the future submarines could even be tasked to assist with space asset reconstitution, cyber attack, EW and ballistic missile defense. US submarines can do any of the traditional missions — but not all at once.<sup>68</sup>

If a future program fields a small number of penetrating bombers, their primary role will likely be limited to attacks against very high value targets, since they will lack the mass for larger-scale attacks. A larger mix of standoff and penetrating platforms could increase the scale and persistence of attacks US military forces could conduct, to include targets deep in China's interior. This would significantly complicate Chinese defense planning. Conversely, limiting US operations

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<sup>66</sup> China's continued military buildup could stimulate a US response designed to preserve a stable military balance. However, as the US experience leading up to World War II is not encouraging, this cannot be assumed. Moreover, given the rapidly declining US fiscal posture, it may not have the same capacity to respond that it has had over the last century.

<sup>67</sup> Based on typical deployment patterns during periods of tension, US forces would have as few as fifteen submarines and fifteen long-range penetrating bombers, plus residual B-52 and B-1 bombers, available in the Western Pacific at conflict's start. These would not represent much of a deterrent when confronted with an adversary with powerful A2/AD-dedicated forces.

<sup>68</sup> Submarines are a particularly scarce resource given the heavy mission demands placed upon them. This problem will only worsen as the current force of about fifty-five SSNs decreases to as few as forty by the late 2020s.



to a single dimension—standoff or penetrating—would dramatically simplify the PLA's defense requirements, leaving more resources for offensive operations.

The PLA's employment of nuclear submarines (and long-range diesel submarines if fielded) against US SLOCs would require US and/or allied convoy escort ships in considerable numbers. At present, these escort tasks could be carried out only by AEGIS ships that would be in high demand for other missions. The Navy's Littoral Combat Ships (LCS), scheduled for production in significant numbers over the next decade, will not be suitable for such escort duty as currently configured due to their lack of defensive capability against air and surface threats.

The US aerial refueling fleet could be under considerable stress given the large Western Pacific intra-theater distances, the need to maintain more orbits to support operations over a vastly larger expanse than in other theaters, and the added demand for fuel if aircraft have to fly much greater distances due to an inability to operate from forward bases. Similarly, the maritime patrol aircraft fleet would be heavily tasked for surveillance and ASW missions over very large operating areas.

Another force structure constraint during the early stages of a conflict is that a large proportion of the available naval forces (i.e., those not in extended maintenance periods) based in CONUS would not immediately be available in theater. Given the vast distances involved, reinforcements would take weeks if not months to arrive.

A qualitatively different kind of force structure constraint is presented by the de facto inability of significant portions of US programmed military forces (e.g., high-value surface units, including aircraft carriers and their short-ranged tactical strike aircraft, and short-ranged land-based strike aircraft if forward bases are damaged) to operate at acceptable levels of risk within the Chinese A2/AD threat rings. As long as that threat is not considerably attenuated, these forces effectively do not exist for operational purposes.

One key consequence of these collective constraints is that US forces are unlikely to be able to conduct the large-scale, near-simultaneous operations that have enabled the very short major campaigns to which they have grown accustomed.

**PAYLOAD AND GLOBAL MUNITIONS INVENTORY CONSTRAINTS.** US forces will face considerable ordnance constraints. Some shortages will be due to the great quantities of ordnance needed to support the type of large-scale operations that will be necessary. Others will stem from inherent platform limitations. Still others will simply be due to shortages in the US military's global inventory of particular types of weapons (e.g., LACMs, ASCMs, SAMs, AAMs, JDAMs, and JASSMs) and expendable sensors (e.g., sonobuoys).<sup>69</sup> The US military also lacks depth in its sea- and land-based ballistic missile defense magazines. The situation is unlikely

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<sup>69</sup> Among the reasons for this are the high unit cost of many such weapons and the potential for block obsolescence that could render costly investments in larger stockpiles of rounds worthless.



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to improve as missile attackers will almost certainly retain their advantage as long as very expensive kinetic kill interceptors are the only effective means available to the defense. Peacetime inventories of precision-guided munitions would be exhausted quickly in a high-intensity war against a powerful enemy. The ability to sustain such a war without a prolonged operational pause potentially lasting months would require considerable increases in global inventories.

Exacerbating these constraints, the US defense industrial base, as currently configured, would be unable to ramp up production of many items, given a lack of surge capacity and insufficient numbers of highly-trained skilled workers. Moreover, the inherent complexity of producing some items (e.g., satellites, air platforms) precludes compression of production timelines.

Given the growing PLA ballistic missile threat, there is considerable risk in storing large amounts of expensive ordnance at forward bases such as Guam, even in hardened storage facilities. But the principal alternative, moving ordnance to forward bases on an “as-needed” basis entails shipping it along potentially vulnerable SLOCs and assumes that the handling facilities there will remain intact.

Platform payload limitations present a very different kind of constraint. Submarines will be able to operate considerably further forward than high-value surface warships; however, they carry only a relatively small number of offensive weapons.<sup>70</sup> Once these weapons are expended, submarines must transit to rear areas to rearm, as they cannot be rearmed at sea.

The Navy’s AEGIS ships are also payload-constrained. Cruisers have 122 vertical launching system (VLS) cells, while the more numerous destroyers have 96 cells. These normally contain a mix of offensive land-attack cruise missiles and defensive SAMs (including anti-ballistic missile variants).<sup>71</sup> Even if all cells were dedicated to the air and missile defense role, in the wake of an initial PLA ballistic missile barrage (as called for in PLA doctrine), early magazine exhaustion would be highly likely, and would require the ships to retire to rear areas to rearm, as they too cannot rearm with missiles at sea.<sup>72</sup>

The short-range stealthy tactical strike aircraft in DoD’s Program of Record carry small numbers of munitions internally in order to maintain their

<sup>70</sup> The four *Ohio*-class SSGNs can carry up to 154 Tomahawk missiles each. However, it is unlikely that more than one or two would be available in theater early in a conflict. Even then, there would be the question of what difference those relatively few cruise missiles would make in the context of a large-scale conflict. The Navy currently has no plans to replace these SSGNs when they reach their projected end of service life in the late 2020s.

<sup>71</sup> By the end of FY2010, the Navy will have 21 AEGIS ships with BMD defense capabilities, and 32 by FY2015. The goal is to upgrade all AEGIS ships to make them BMD-capable.

<sup>72</sup> Conservation of rounds is rendered even more difficult in that most operational firing doctrines call for firing multiple SAMs per engagement to ensure a sufficiently high probability of kill. For example, see General Patrick O’Reilly, USA, unclassified statement before the House Appropriations Committee Defense Subcommittee of April 2, 2009, [http://appropriations.house.gov/witness\\_testimony/DE/Patrick\\_OReilly\\_04\\_02\\_09.pdf](http://appropriations.house.gov/witness_testimony/DE/Patrick_OReilly_04_02_09.pdf).

low-observable profile. Thus even if these aircraft were able to reach their targets, their limited payloads would require either large numbers of attackers — which would be difficult to support with tanker aircraft across the enormous distances in the theater — or sustained operations over a long period of time.

**OPERATIONAL LOGISTICS AND SUSTAINMENT WEAKNESSES.** Sustaining operations logistically past the Second Island Chain (i.e., west of Guam) will present a particularly difficult challenge for the Air Force and Navy, primarily because of the vulnerability of the few US bases in the theater and the small size of the naval logistics force. In addition to this, there will be increased demands on the aerial tanker fleet if US forces are denied access to forward bases.

There is no “silver bullet” solution to protecting forward bases and restoring them to “sanctuary” status. The best that can be hoped for is that some combination of the standard active and passive defensive measures, coupled with repair and remediation capabilities and capacities, can enable their periodic use and force the PLA to divert resources in attempting to put them back out of action.

The current naval logistics force is sized to support the peacetime operations of deployed naval forces, and is not programmed to increase significantly in size or capacity. Thus it is *prima facie* unable to resupply large numbers of naval reinforcements deploying to the Western Pacific. While some work-arounds would no doubt become available (e.g., employing allied assets, mobilizing Maritime Administration assets), the limited numbers of replenishment ships would impose considerable constraints on naval operations during the initial stages of a conflict.

The shortage of logistics assets will be further aggravated if forward port facilities become unusable due to PLA missile barrages, air strikes, or attempts at blockade through the use of mines and/or submarines. If ships are unable to enter port safely or use port facilities, resupply would be limited to underway replenishment, since other types of supply ships (i.e., those not built for underway replenishment) could not unload their cargoes in port for later loading onto moored warships. Rearming forward would not be possible. Here too, the huge distances entailed in moving supplies forward to the Western Pacific from rear areas would greatly extend operational timelines.

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Having examined the principle operational problems posed by a robust A2/AD operational approach in the Western Pacific theater, we now turn to the substance of a candidate AirSea Battle concept to address them.

Sustaining operations logistically will present a particularly difficult challenge for the Air Force and Navy.



## CHAPTER 3 > THE SUBSTANCE OF AN AIRSEA BATTLE CONCEPT

As stated in Chapter 1, an AirSea Battle concept<sup>73</sup> is primarily about combat at the operational level of war in the Western Pacific Theater. To be viable and useful, it must therefore address the operational problems (described in Chapter 2) that would be created by a robust PLA A2/AD operational approach designed to exclude US military forces from the region.

In addressing this operational challenge, it is necessary to make some key assumptions regarding the characteristics of a major conventional Sino-US conflict. These assumptions involve factors that will likely exert a significant influence on the prospects for a successful allied defense of the Western Pacific. To the extent that an assumption works in favor of the United States and its allies, the AirSea Battle concept outlined below should also be evaluated in the event the assumption proves incorrect. Similarly, in those cases where an assumption works against the United States and its allies, the situation should also be assessed should it prove false.

The military balance in Central Europe along the intra-German border between NATO and the Warsaw Pact during the Cold War provides a useful historical example. Two factors were believed to have a major effect on the military balance: the amount of warning time NATO would have prior to a Warsaw Pact attack, and alliance cohesion. Thus the viability of NATO's defense was assessed assuming various levels of attack warning; some more favorable, some less so. The military balance was also assessed employing different assumptions as to whether or not "fault lines" would emerge between the Soviets and their Eastern European satellites, and whether or not the NATO allies would respond to an attack in "lock-step."

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<sup>73</sup> This chapter discusses an AirSea Battle *concept*, as distinguished from *doctrine*. Whereas a doctrine deals with extant assets, a concept allows for consideration of potential as well as actual forces and capabilities that exist in the force now or are in the Program of Record.

The purpose of “thinking about the unthinkable” is so that ways can be found to sustain and enhance a stable military balance, thus keeping conflict in the domain of the “unthinkable.”

To those who would argue that a Sino-US conflict is “unthinkable,” it should be emphasized again that the purpose of “thinking about the unthinkable” is that by doing so, ways can be found to sustain and enhance a stable military balance in the Western Pacific, thus keeping conflict in the domain of the “unthinkable.”

Toward this end, AirSea Battle suggests what an overall US Western Pacific military campaign might look like, to include its principal components, required missions and tasks, how these would be accomplished, and by what forces. Important elements requiring consideration include operational timelines and the timing, prioritization and sequencing, and tempo of operations.

## CRITICAL ASSUMPTIONS

The following assumptions underpin the subsequent discussion of a point-of-departure AirSea Battle concept:

**THE UNITED STATES WILL NOT INITIATE HOSTILITIES.** This paper assumes that China would have the strategic and operational initiative at the outset of war and that, even with warning, US military forces would not be authorized to preempt imminent Chinese military action kinetically. Thus the United States must be able to recover from the initial blow by aggressor forces and sustain operations for the concept to be viable.

**MUTUAL NUCLEAR DETERRENCE HOLDS.** Tacit agreement not to use or threaten the use of nuclear weapons would appear to be in both parties’ interests. There have been several wars where weapons of mass destruction were possessed by one side or the other, and yet were not employed, even by the defeated power. In World War II, Germany accepted a total defeat at the hands of the allies without employing its formidable arsenal of chemical weaponry. In the First Gulf War, Iraq suffered a severe defeat but did not resort to the use of its chemical weapons. If this assumption does not hold and nuclear warfare ensues, then the character of the conflict would change so dramatically as to render discussion of major conventional warfare<sup>74</sup> irrelevant. Of course, an AirSea Battle operational concept and its associated capabilities are intended to deter conventional acts of coercion or aggression, thereby reducing the prospects of a nuclear confrontation.

**INTELLIGENCE AND WARNING (I&W) WILL BE LIMITED.** A notional conflict such as that postulated in Chapter 2 could occur after a prolonged period of tension,

<sup>74</sup> The term “conventional war” here denotes a conflict not involving nuclear weapons by either side. Such a war likely would involve space warfare and cyber warfare, to a far greater extent than previously seen in “conventional” wars.

indirect confrontation, and possibly direct confrontation. While strategic warning might thus be reasonably assumed, surprise at the operational and tactical levels cannot be ruled out.

**JAPAN AND AUSTRALIA WILL BE ACTIVE US ALLIES.** Given the fundamental values and interests these allies share with the United States, it seems reasonable to assume that if the stakes in a confrontation were sufficiently high to trigger a Sino-US conflict, they would be high for US allies as well. Japan's participation would significantly complicate Chinese planning and operations by forcing a major diversion of military forces that would otherwise be available for use against the United States and its allies. In addition to Japan's capable military forces, Japanese territory offers some measure of strategic depth to the allies in its eastern and northern regions as well as important physical barriers to enable allied ASW operations. Japan also possesses numerous air and port facilities, some of which are only targetable by longer-range and thus scarcer PLA ballistic missiles. If Japanese territory were no longer available, US power-projection options would be significantly constrained. Similarly, Australia would provide strategic depth and capable forces for peripheral campaigns, perhaps involving sea control and support operations in the eastern Indian Ocean, Oceania and the South China Sea.

**NEITHER US NOR CHINESE TERRITORY WILL BE ACCORDED SANCTUARY STATUS.** Neither belligerent will be off-limits to strikes by the other. At a minimum, selected US conventional counterforce strikes—both kinetic and non-kinetic (e.g., cyber)—inside China will be authorized from the conflict's onset. A limited number of very high-leverage targets, principally those related to China's air defenses, command and control, ISR, and counter-space/space control, as well as fixed-site and mobile ballistic missiles (including production sites), lie at the heart of the PLA's A2/AD operational approach. According these targets sanctuary status would severely undermine US attempts to maintain a stable military balance in the Western Pacific and, as such, decrease the effectiveness of deterrence.

**SPACE WILL BE CONTESTED.** If China were willing to take the extreme risk of initiating war in the first place, it would hardly hesitate to conduct attacks against vulnerable US space systems. The United States would conduct counter-space operations upon the outbreak of hostilities.

**A PROLONGED WAR WOULD FAVOR THE UNITED STATES.** Owing to the US advantage in maritime forces and its global basing posture, during a large-scale conflict China's seaborne trade flows would be cut off, with an eye toward exerting

major stress on the Chinese economy and, eventually, internal stress.<sup>75</sup> Given this assumption, a key US objective in any conflict must be to deny China a quick victory, which it could obtain by inflicting such setbacks to US military capabilities and assets that the United States would not elect to continue the conflict; driving a major ally (e.g., Japan) out of the war; or making an eventual US victory appear so prolonged or costly that the American people would lose the will to sustain the war efforts.<sup>76</sup>

## A CANDIDATE AIRSEA BATTLE CAMPAIGN

A candidate AirSea Battle operational concept must take into account various important components (both concurrent and sequential) of the overall campaign, the size and capabilities of the forces involved, and the geography of the theater of operations. Given the assumption that US and allied forces will receive, at best, tactical warning, the discussion that follows posits that at the initiation of hostilities US military forces in theater are not fully generated (i.e., reinforced). Given strategic warning, these forces might be somewhat greater than those normally in theater for deterrence and crisis stability purposes, given the growing tensions that would likely precede the conflict. Still, most US forces would remain in or near their routine operating areas, and thus need to move into theater following the failure of deterrence and the outbreak of conflict.

The successful execution of the AirSea Battle campaign described below would depend heavily on whether the US military would have been able to make significant changes to the Program of Record over the coming decade. Those changes would be designed to reduce the effectiveness of the initial PLA blows, conduct vigorous counterattacks to minimize the amount of damage to US and allied forces, and set conditions to sustain a follow-on campaign (prolonged if necessary) to achieve US war objectives.

The AirSea Battle campaign has two distinct stages.<sup>77</sup> The initial, early stage, commencing with the outbreak of actual hostilities, would comprise these four distinct lines of operation:

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<sup>75</sup> As an historical analogy, the Royal Navy's World War I blockade helped to create major internal stresses that significantly contributed to the collapse of the German war effort in 1918.

<sup>76</sup> Note, however, that duration in time versus US advantage may not be linear, but might follow a bell curve; while China might feel growing pressures for a considerable time, this could become offset by growing war-weariness among the US public, especially if persistent cyber attacks and negative economic consequences of the conflict exacted growing costs at home.

<sup>77</sup> "Stages" is used here advisedly to avoid use of "phases," which has become associated with distinct sequential operations. Thinking in terms of "phases," as the US military has become accustomed to in recent years, would be suboptimal in an AirSea Battle context. It is more useful to think in terms of the fluid interplay of lines of operations and the elements comprising them along varying timelines, which themselves may change, depending on enemy actions or on suddenly emerging opportunities.

- > Withstanding the initial attack and limiting damage to US and allied forces and bases;
- > Executing a blinding campaign against PLA battle networks;
- > Executing a suppression campaign against PLA long-range, principally strike systems;
- > Seizing and sustaining the initiative in the air, sea, space and cyber domains.

These lines of operation and their key sub-components would have differing execution timelines. While some would unfold in parallel, the initiation of others would depend on progress being made in other aspects of the campaign. Many forces and capabilities would be in high demand across multiple lines of operation, forcing tough decisions regarding their employment. Some sub-components would likely be resolved much more rapidly than others. For example, efforts to deny PLA surface ships access in the East China Sea could be a question of weeks, while the ASW campaign to neutralize the PLA submarine force could last for months.

The follow-on second stage would comprise various subsequent operations and measures that would contribute to the larger US strategy creating options to resolve a prolonged conventional conflict on favorable terms and reverse any initial military gains by the adversary. These would include:

- > Executing a protracted campaign that includes sustaining and exploiting the initiative in various domains;
- > Conducting “distant blockade” operations;
- > Sustaining operational logistics; and
- > Ramping up industrial production (especially precision-guided munitions).

There would not necessarily be a clean break between stages. Some follow-on operations would simply be continuations of those already ongoing. Nor would there be a clear temporal distinction between stages, in that certain second-stage operations may be conducted while first-stage operations are under way e.g., deployment of assets to distant blockade stations).

### **Withstanding the Initial Attack**

During the pre-conflict confrontation or crisis period, regional allies and security partners clearly would expect US forces to remain forward and be reinforced to demonstrate commitment to allies, and to deter further provocative acts by



China, to include coercion or aggression.<sup>78</sup> Conversely, evacuating US military forces from particularly vulnerable forward bases, for example Kadena Air Base or failing to move additional key assets such as strike aircraft to Guam or other forward bases could well be seen politically as signs of serious weakness by wavering allies. Placing US forces in these vulnerable locations, however, could result in greater losses in the event deterrence failed.

Assuming that the United States would have only days of operational and tactical warning, US and allied forces would undertake as many defensive measures as possible, while posturing available forces to execute limited high-priority offensive operations while the United States and its allies are weathering the initial PLA offensive. Clearly, the greater the warning time, the more thoroughgoing the allied defensive preparatory measures would be.

For air assets, the normal defensive “operating under threat” principles and measures pertain, to be carried out as far in advance of possible attack as possible.<sup>79</sup> They include:

- > Deploying attack warning systems;
- > Positioning active and passive base defenses, including moving high-value assets (e.g., stealth aircraft) into hardened shelters and air- and sea-based BMD assets to pre-assigned stations (land-based BMD assets would presumably already be emplaced, though additional assets could be moved into theater if circumstances permitted);<sup>80</sup>
- > Executing tactics, techniques and procedures (TTPs)<sup>81</sup> to support short-notice, rapid aircraft launch operations, and rapid repair and remediation efforts;

<sup>78</sup> This point has been raised in particular by senior foreign military officers participating in various CSBA events.

<sup>79</sup> Clearly there are implicit assumptions that the prerequisites for carrying out some of these measures would have been put in place beforehand. These will be addressed in the “Candidate Initiatives” discussion in Chapter 4.

<sup>80</sup> The Air Force is studying an Air-Launched Hit-to-Kill (ALHK) ballistic missile defense system that envisions fighter aircraft carrying missiles for both boost-phase and terminal-phase interception missions. The operating concept for a Network Centric Airborne Defense Element (NCADE) envisions using the host aircraft providing much of the lift needed to position the interceptor for attack, enabling a relatively small, cheap missile to be employed for the mission. This is in contrast to another, nearer-term, concept exploring use of F-15 fighters to carry far more expensive PAC-3 missiles for this purpose. See, for example, [http://www.spacewar.com/reports/The\\_Air\\_Launched\\_Hit-to-Kill\\_AB\\_M\\_Solution\\_Part\\_12\\_999.html](http://www.spacewar.com/reports/The_Air_Launched_Hit-to-Kill_AB_M_Solution_Part_12_999.html), and [http://www.satellitetoday.com/smd/Schwartz-Mulls-Aircraft-Mounted-Air-Launched-Hit-To-Kill-Missile-Defense-Systems\\_31516.html](http://www.satellitetoday.com/smd/Schwartz-Mulls-Aircraft-Mounted-Air-Launched-Hit-To-Kill-Missile-Defense-Systems_31516.html). In theory this mission could be conducted by both land- and sea-based aircraft.

<sup>81</sup> Tactics, techniques and procedures (TTP) provide the detailed direction on how various tasks and operations are to be carried out. For the purpose of this report, the more familiar term “tactics” will be used as shorthand.

- > Executing comprehensive aircraft dispersal operations to rear area bases or satellite fields<sup>82</sup> (if aircraft can be properly supported logistically there), and
- > Conducting responsive distributed logistics operations to sustain widely dispersed air operations.

The principal objectives of these efforts are to minimize the damage to bases and air assets, while complicating enemy planning and increasing the PLA's uncertainty that their missile offensive will be effective. In so doing, the expectation is that the time required to get bases back into at least partial operation, for purposes both of using them and placing additional demands on the PLA's limited supply of longer-ranged ballistic missiles, will be significantly reduced.

Naval forces in port at forward bases (primarily in Japan) would be postured to get underway for sustained periods on short notice (24–48 hours). Upon warning, US and Japanese AEGIS ships would proceed to pre-assigned BMD stations. Particularly high-value units such as carriers would remain or move beyond the PLA's A2/AD threat range and operate in accordance with appropriate operational deception precepts to avoid attack. Assuming the program lives up to its supporters' expectations, carrier-based aircraft could be employed as part of the BMD effort if equipped with air-launched hit-to-kill (ALHK) weapons. Assets assigned operational deception and electronic warfare missions would move to preplanned stations.

US and allied submarines would move to forward stations and commence ASW operations (including operations inside the First Island Chain and ASW barrier operations along the Ryukyus island chain and across the Luzon Strait). US SSGNs and selected SSNs, allied submarines, and other undersea strike systems would be positioned in Chinese littoral waters for ISR, support for joint strike missions (e.g., SEAD), and missions against undersea infrastructure targets. Local ASW operations would be conducted near the approaches to allied and US Western Pacific major ports and naval bases, including Guam and Hawaii.

On the assumption that Kadena, Guam and satellite bases elsewhere in the Marianas would be rendered unusable by PLA missile strikes at least temporarily early in any major conflict, US air and missile defense reinforcements would flow into eastern Japanese bases to reinforce JASDF defenses against PLA air attacks coming from across the East China Sea, and possibly the Sea of Japan. Such early reinforcements would be important in helping defend targets in Japan and stiffen Japanese resistance and resolve.

From outside the Western Pacific Theater of Operations (WPTO), ongoing operations would include:

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<sup>82</sup> These might include locations such as Tinian, Saipan, and Palau, which have airfields dating back to World War II, but which would require substantial improvements to support modern air operations, including expanded logistical support systems and possibly some hardening.

- > Moving reinforcing naval and air units into theater;<sup>83</sup>
- > Moving additional precision-guided munitions stocks into theater;
- > Initiating convoy escort and other SLOC protection measures.

The central AirSea Battle competition may be characterized as a “scouting battle” in which both sides would wage “blinding campaigns” to deny the adversary vital ISR information by destroying or degrading its C2 and sensor networks.

The great trans-Pacific distances dictate that naval reinforcements based in the continental United States (CONUS) would take weeks to arrive in the WPTO. Even warships operating in the Persian Gulf would take a week to steam at high speed as far as Singapore. Air reinforcements could arrive far more rapidly, but their operations could be impeded by damaged bases and operational logistics bottlenecks (e.g., insufficient fuel, parts, and ordnance available forward for sustained operations).

### Executing a Blinding Campaign

The central AirSea Battle competition between the PLA and the US and allied militaries may be characterized as a “scouting battle” in which both sides strive on a continuous basis to find and strike the other’s key targets while denying the other side the ability to do the same. This battle would be fought in all warfare domains, including space, cyberspace and the undersea. The effectiveness of the PLA’s A2/AD battle network is critically dependent on its ability to detect, identify and target approaching forces at extended range; indeed, the PLA’s ISR systems could be considered the Achilles’ heel of its A2/AD approach. The US military is also highly dependent on the functioning of its battle networks.

Accordingly, both sides would seek to wage “blinding campaigns” whose dual objectives are to deny the adversary vital ISR information by destroying or degrading its C2 and sensor networks; and to protect its own capabilities.

The scouting battle would start well before hostilities commenced. Intelligence preparation of the battlespace in all domains may have been taking place for years beforehand. Non-lethal, non-kinetic and probably unattributable operations would be undertaken for the purpose of conducting network reconnaissance and implanting the means to execute attacks immediately at the onset of hostilities. The cyber, space and undersea domains would have to be “mapped” recurrently and as thoroughly as possible to minimize the time required to execute attacks against key nodes and sites in these critical domains.

<sup>83</sup> Such preparations would normally require several days for ships alerted for possible short-notice deployment and longer for those not alerted. Transit times for ships leaving from West Coast bases would require additional weeks to arrive in theater. Thus US naval forces in-theater could not be readily reinforced for a significant period. Air reinforcements would move mainly to allied bases not under direct threat of heavy PLA missile attack (e.g., eastern Japan, Australia), as the movement of additional aircraft to vulnerable Western Pacific bases prior to hostilities would increase Chinese incentives to preempt. The ability to use such bases over time would depend heavily on the efficacy of base BMD defenses and progress in the missile suppression campaign.

During the run-up to hostilities, PLA and US forces would conduct “precursor” operations consisting of probes and deniable attacks in the cyber and undersea domains. Similarly, various measures would be taken to defend US space systems while posturing counter-space capabilities to disrupt Chinese space-based ISR.

At the outset of hostilities, the US would immediately implement its blinding campaign. There would be a premium on early execution of offensive blinding actions, particularly those in the space and cyber domains since success or failure in these areas would have substantial second-order effects on the competition to exercise control in other domains. Of note, though unlikely, if early action to blunt PLA counter-space operations proved successful, US ability to access its space systems would provide powerful and cumulative advantages.

Blinding PLA systems is essential for AirSea Battle’s success in every other line of operation. The PLA’s loss of its space systems would degrade its ability both to target and to conduct battle damage assessments of targets not covered by other ISR systems. It would become particularly difficult to monitor US base repair and remediation efforts following PLA strikes on allied air bases, which is essential to optimize its plans for follow-on strikes. While fixed targets could still be struck on a recurring timeline, post-blinding PLA missile shots would essentially be “shots in the dark,” accelerating the depletion of the PLA’s long-range missiles. If the US had established smaller “bare bones” air bases on islands in the Second Island Chain (besides Guam), these bases could allow for limited sustained air operations as the PLA is confronted with playing a “shell game,” guessing which bases might be in operation and warrant a missile salvo.

Here the integrated aspect of AirSea Battle merits a theoretical example in the form of US and allied forward base defense. Let us assume that it takes ten PLA missiles to destroy a wholly undefended forward US base. Employing missile defenses might raise the price to twenty PLA missiles. Let us further assume that US and allied efforts to blind the PLA’s scouting capability is generally successful and that the allies can proliferate the number of bases available for strike operations from one to, say, five. Now to ensure that forward-based allied strike aircraft are suppressed, the PLA must target five bases, not one, raising the missile expenditure requirement to one hundred (twenty per base). Note that the allies would not have to provide missile defenses for each base, only the one base from which their strike aircraft are operating.<sup>84</sup> Then assume that each base is hardened. The cost to conduct effective missile suppression operations for the PLA rises higher still. Finally, if US and ally suppression operations are even modestly successful in reducing the PLA’s ability to conduct optimum salvo missile strikes on friendly forward bases, this reduces the stress on allied missile defenses, further complicating the PLA’s problem — and raising its costs.

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<sup>84</sup> The term of art for this form of missile defense is “preferential defense.”

This brief excursion demonstrates two principles: first, AirSea Battle operations are strongly integrated; second, the relative ineffectiveness of kinetic kill missile defense interceptors does not mean that the allies' defense of forward bases is a lost cause. Of course, mounting such a defense would likely incur substantial costs, and may pose difficult trade-offs in DoD's program of record. The issue of how trade-offs might be made will be discussed presently.

Similarly, if the PLA could be denied adequate targeting data through disruption or destruction of its ISR and command-and-control networks, the threat from its offensive A2/AD systems against mobile targets (i.e., major surface combatants) would be significantly reduced. This would be particularly useful in terms of regaining or increasing naval freedom of maneuver over large areas.

### *Blinding PLA ISR Systems*

An AirSea Battle campaign against China's space-based systems would center on two actions: promptly neutralizing PLA on-orbit assets through non-kinetic means; and destroying key elements of the PLA's counter-space capabilities. Success here could severely limit the PLA's space-based situational awareness, seriously compromising its ability to attack US space systems, including those deployed as replacements for destroyed assets. To preclude continuing (and perhaps fatal) damage to the US space architecture, these strikes would need to be executed promptly.

Other PLA ISR systems would be attacked in much the same way, with a particular emphasis on destroying or degrading those systems enabling long-range attacks. The PLA's OTH radars constitute a particularly powerful sensor system for detecting ships and aircraft at great distances. Disabling these radars with kinetic and non-kinetic attacks would be among the earliest US strike priorities. In the undersea domain, early efforts would focus on destroying any PLA sea-bottom arrays to facilitate the ASW campaign.

US blinding actions would include (see Figure 7):

- > Conducting early penetrating strikes on selected high-priority targets to deny PLA space situational awareness and to destroy key elements of the PLA's ground-based counter-satellite capabilities;
- > Initiating offensive cyber warfare against PLA space systems, including ground control stations;<sup>85</sup>

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<sup>85</sup> The decision to engage in strategic-level cyber warfare would be made at the most senior level of government in view of the strategic and other (e.g., legal) issues entailed. Moreover, such operations would not necessarily be conducted (solely) by military organizations.

- > Executing early penetrating strikes—both kinetic and non-kinetic—against PLA OTH radars and ground-based ISR nodes;<sup>86</sup>
- > Disrupting PLA airborne ISR sensor and communications relay platforms;<sup>87</sup>

<sup>86</sup> Destroying these radars would be vital to denying targeting data to long-range PLA strike systems such as ASBMs and ASCM-armed aircraft and submarines.

<sup>87</sup> Navy fighters operating well away from their carriers, which would remain outside the PLA's A2/AD threat range, could play an important role in this mission against such PLA systems operating far out to sea.

**FIGURE 7. CHINESE LONG-RANGE RADAR AND SPACE FACILITIES AND AIR DEFENSES (2010)**



Image: CSBA

Source: John Pike, "Chinese Space Facilities," *GlobalSecurity.org*, last modified August 16, 2009, accessed at <http://www.globalsecurity.org/space/world/china/facility.htm> on 24 March, 2010; Sean O'Connor, "China's Other ASAT," *IMINT & Analysis*, entry November 3, 2009, accessed at <http://geimint.blogspot.com/2009/11/chinas-other-asat.html> on 24 March, 2010; Sean O'Connor, "Worldwide SAM Site Overview," *IMINT & Analysis*, entry March 20, 2010, accessed at <http://geimint.blogspot.com/2008/06/worldwide-sam-site-overview.html> on 24 March, 2010.

- > Deploying area electronic warfare and operational deception platforms to deny or spoof PLA ISR systems; and
- > Severing Chinese undersea ISR and communications links.<sup>88</sup>

### *Defensive Measures*

Given the US military's heavy dependence on space systems and the likelihood that the PLA will inflict substantial damage on them despite US defensive efforts, it would be important to develop alternatives to these systems. Such alternatives would include:

- > Deploying back-up airborne C2 and ISR systems to offset, if only partially, the loss of space systems;
- > Defending US support aircraft and airborne sensors and communications relay platforms operating over the WPTO against PLA fighters armed with long-range air-to-air missiles.<sup>89</sup>

Since it would be imprudent to assume US space assets will be spared attack, various airborne sensors and components of battle network systems such as Battlefield Airborne Communications Nodes (BACN) should be deployed to provide supplementary capability or, in the event of lost space functionality, work-arounds. However, even if successful, these efforts will likely provide significantly less capacity and bandwidth than on-orbit systems.

To preserve as much of their effectiveness as possible in a space-degraded or space-denied environment, US and allied forces should assume they will conduct operations in this environment, and exercise and plan accordingly.<sup>90</sup> Both the Air Force and Navy should examine in detail those data flows and types that are essential for operations under differing levels of capacity constraints. Similarly, both Services must become deeply familiar with those crucial functionalities and capacities with an eye toward prioritizing their defense and reconstitution, not only for Service-specific missions, but for their combined operational requirements.<sup>91</sup>

<sup>88</sup> The severed links would include both civilian telecommunications lines and undersea sensor arrays. The latter would be part of the ASW sub-campaign.

<sup>89</sup> Similarly, Navy fighters could play an important role in enabling otherwise vulnerable Air Force platforms to operate further forward over large ocean expanses than would be the case if they were unescorted. The Air Force could of course provide its own fighter escorts, but at the cost of imposing added burdens on the aerial refueling fleet.

<sup>90</sup> During the latter part of the Cold War, the Navy routinely conducted multi-day "Smallpipe" exercises simulating the loss of satellite communications during which units had to use much lower-capacity high-frequency (HF) band transmitters and receivers for long-haul communications.

<sup>91</sup> The last US non-space-based electronic navigation system ceased operation on February 8, 2010, when the US Coast Guard shut down transmission of most of the LORAN-C navigation system, thereby leaving no global back-up system to GPS. See <http://coastguard.dodlive.mil/index.php/2010/02/coast-guard-terminates-loran-c-broadcast/>.



### *The Scouting Battle Continues*

Assuming the loss of space systems for both sides, the “scouting battle” would continue. The PLA is projected to acquire large numbers of low-observable HALE ISR UAVs in coming years.<sup>92</sup> Each side would likely attempt to extend its airborne ISR networks as far as necessary to accomplish their missions. Thus the PLA would extend its airborne ISR sensor and supporting communications relay networks, as a complement to its land-based over-the-horizon radars, sufficiently far out to keep US aircraft carriers and other surface ships beyond their effective land-attack ranges. Extended-range low-observable PLA HALE ISR UAVs could be used to provide surveillance of Guam and satellite bases and to provide Chinese commanders with BDA.

Similarly, US airborne ISR platforms would extend forward to enable surveillance and strike operations against PLA missile forces, surface ships and submarines; to detect and engage PLA airborne ISR assets; and to defend friendly airborne stand-off strike and support platforms and surface ships from PLA air threats (possibly equipped with very long-range air-to-air missiles). In essence, these operations would constitute the continuing competition between the two sides’ battle networks after their space-based components had been degraded or destroyed.<sup>93</sup>

The attrition of PLA ISR battle network components over maritime areas would be crucial to neutralizing the Chinese ASBM and long-range air- and submarine-launched ASCM threat to allied surface ships. Classifying detections and targeting remains the most challenging aspect of striking mobile targets at sea. This is particularly true when operating amid clutter that requires discriminating among multiple sensor returns/contacts, whether real or apparent (i.e., generated through various operational deception techniques and means), to determine which targets should be attacked. Hence “blinding” PLA maritime targeting systems would be vital to reduce the threat to US and allied naval surface forces.

Rolling back PLA airborne ISR battle network elements would be an important new mission for carrier strike groups and their air wings in AirSea Battle. Upon cueing, carrier-based fighters would intercept and attrite PLA airborne ISR platforms, thus helping to roll back the PLA airborne ISR battle networks. Coupled with the possible ALHK-based BMD role discussed earlier, carrier aircraft could be used to good effect in roles for which they were not primarily designed until

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<sup>92</sup> See *Annual Report to Congress on the Military Power of the People’s Republic of China*, 2009, pp. 23–26. Future US long-range/endurance UAVs (e.g., the N-UCAS), could also be deployed with sensor packages.

<sup>93</sup> Tom Ehrhard and Robert Work have referred to this collision of battle networks as the “Outer Network Battle,” an allusion to the Navy’s 1980 “Outer Air Battle” concept. See Thomas P. Ehrhard and Robert O. Work, *Range, Persistence, Stealth, and Networking: The Case for a Carrier-Based Unmanned Combat Air System* (Washington: CSBA, 2008), p. 197–222.



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their carriers could enter, at acceptable levels of risk, areas from which they could perform more traditional strike operations.<sup>94</sup>

Electronic warfare (EW) is waged to secure and maintain freedom of action in the electromagnetic (EM) spectrum.<sup>95</sup> All three of its elements, electronic attack (EA), electronic protection (EP), and electronic support (ES), would be key elements of the “scouting battle.”<sup>96</sup> PLA military writings place considerable emphasis on using various means of electronic attack to interfere with US sensors, data links and communications.<sup>97</sup> Thus effective electronic protection to counter PLA electronic attacks would be a critical enabler of virtually all other US and allied operations.

US military forces would also employ extensive electronic attack operations to deny PLA forces use of the EM spectrum. As their objective, these operations would degrade and deny PLA C2 and ISR information flows. In this role, US EA and ES efforts are critical enablers of offensive operations such as penetrating and stand-off strike. Dominating the EW competition as early as possible would be critical to winning the scouting battle and eventually prevailing in the conflict.<sup>98</sup>

Various kinds of deception (e.g., electronic deception) and techniques such as decoying and spoofing would be particularly useful in complicating PLA efforts to target high-value allied assets, especially aircraft and warships that could only

<sup>94</sup> In some sense, this would echo the Navy’s experience in World War II, when many warship types ended up being used in roles for which they had not been expressly designed (e.g., aircraft carriers emerging as the principle strike platforms, and battleships being used for shore bombardment and anti-aircraft protection of carriers rather than as frontline battle line combatants). In another analogy from that war, by 1944–1945 carrier air wings were heavily stocked with fighters rather than the previous fighter-bomber mix in order to deal with the primitive “ISR networks” of Japanese patrol planes aiding massed kamikazes, which were in essence manned anti-ship cruise missiles. Today’s US carriers facing a formidable PLA A2/AD threat may have to be used in analogous fashion to deal with a conceptually similar if more formidable threat. This raises the question of whether future carriers need to be as sophisticated and costly as today’s are if their principal function in high-end A2/AD scenarios is to have their aircraft engaged primarily in rolling back hostile airborne ISR and strike assets while the carriers remain well out of enemy strike range. Some observers raised similar questions during the 1980s when it appeared that much of a carrier’s air wing was dedicated primarily to defending the carrier against long-range ASCM-armed Soviet Naval Aviation bombers, viz “the Outer Air Battle” concept that drove many of the carrier aircraft designs of the day.

<sup>95</sup> Joint Publication 3-13.1, Electronic Warfare, January 27, 2007, p. v–vi, accessed at <http://ftp.fas.org/irp/doddir/dod/jp3-13-1.pdf>.

<sup>96</sup> Electronic Warfare, pp. I-2–I-4.

<sup>97</sup> See, for example, the 2006 Report to the Congress of the U.S.-China Economic and Security Review Commission, November 2006, Chapter 3, Section 1, “China’s Military Modernization,” pp. 127–138. The entire report may be access at [http://www.uscc.gov/annual\\_report/2006/annual\\_report\\_full\\_o6.pdf](http://www.uscc.gov/annual_report/2006/annual_report_full_o6.pdf).

<sup>98</sup> One of the less well-known, but extremely important sub-competitions during World War II in the European theater was the relentless electronic warfare conducted by Germany and the Allies to support their air bombardment campaigns and counter the enemy’s. Efforts included the use of (and interference with) electronic navigation as well as early versions of many EA and EP techniques in use today. Winning the EW sub-competition in a Sino-US conflict would almost certainly be at least as critical to success as it was nearly seventy years ago.

be struck by relatively scarce (and costly) PLA assets such as long-range air-to-air missiles and ASBMs.<sup>99</sup> Ideally, such deception operations would cause the PLA to further deplete its inventories of key ordnance against false or low-priority targets.

### *Recurrently Probing PLA A2/AD Systems to Assess Level of Degradation*

The scouting battle will not “stay won.” That is, there will be continuous efforts by both sides to mitigate, reconstitute or work around losses to their respective C2 and ISR systems. Consequently, one of the most challenging problems confronting allied forces involves performing continuous assessments of the state of PLA A2/AD battle networks, including particular sub-components, to determine the extent to which they are degraded or exhausted as a result of allied combat operations. The ability to conduct effective battle damage assessment operations is key to determining progress in the “scouting battle” and in setting the conditions for conducting allied follow-on operations in an extended conflict.

Conducting such assessments is often challenging. The challenge will be greater still if the space-based assets that provide much of the US ISR intelligence data are no longer available. Should this occur, it would put a premium on stealthy, long-range ISR platforms capable of penetrating into PLA-defended air space and surviving while loitering in search of high-value targets to conduct strike and ISR missions, including, *inter alia*, BDA. (Moreover, penetrating strike platforms equipped with ISR capabilities could provide near-real-time BDA on their *own* weapons effects.) Given the large intra-theater distances, such platforms would have to have long-range and high-endurance as well as stealth. These systems would be expensive and thus relatively scarce.<sup>100</sup> However, if progress is made in the scouting battle, it may be possible to introduce less advanced ISR platforms for use in areas where the PLA’s ISR and air defense capabilities have been substantially degraded.

While it may be possible to obtain a sense of the overall degradation of the PLA’s ISR network, determining the degradation of a particular network or system or the residual inventories of particularly dangerous or effective weapons such as ASBMs or long-range SAMs would be more problematic. Persistent allied ISR scouting would be needed to assess changes in the PLA’s A2/AD battle networks status. Deception operations could be employed to incite system activation (e.g., of the PLA’s integrated air defenses) to identify and destroy them, and to induce fires (e.g., against false airborne targets) to help exhaust IADS SAM

Effective battle damage assessment is key to determining progress in the “scouting battle.”

<sup>99</sup> For a useful glossary of specialized terms, see [http://www.sew-lexicon.com/Terms\\_list\\_overall.htm#DD](http://www.sew-lexicon.com/Terms_list_overall.htm#DD).

<sup>100</sup> Though they are very expensive, US investments in high-end IRS assets could compel or inducing the PLA to invest even greater resources to develop and field costly countermeasures.

inventories.<sup>101</sup> Toward this end allied forces would employ platforms or devices to generate false targets to trigger PLA defensive systems. Such platforms presumably would be equipped with deceptive emitters or other means to generate signatures sufficient to trigger a desired response. Of course, as with all decoys, these US and allied “deception” systems must be sufficiently inexpensive to be lost to enemy action.

Even if these tactics succeed in triggering the expenditure (and hence depletion) of key PLA assets such as advanced SAMs, this would probably not entirely eliminate the threat posed by such systems; just as the PLA’s ISR systems cannot be completely suppressed, neither can allied forces expect to eliminate all PLA missile inventories. New production, particularly of long-range ballistic missiles (including ASBMs), as well as SAMs, would be of particular concern: long-range ballistic missiles pose a major threat to allied Western Pacific bases (whose position is fixed and known) and high-value naval units, while SAMs put US ISR and strike systems at risk. In view of this, selected PLA missile production and storage facilities should be struck early in the conflict.

## Executing a Missile-Suppression Campaign

### *Suppressing PLA Land-Based Offensive Missiles*

Countering or thinning the PLA offensive missile threat is a principal AirSea Battle line of operation. Success is critical in preventing China from achieving a quick “knock-out” blow. This requires an integrated mix of offensive and defensive measures such as those discussed previously. AirSea Battle missile suppression operations are designed to suppress or disrupt the Chinese missile bombardment campaign, attrite fixed and mobile missile launchers, and prevent their regeneration to the maximum feasible extent.

Given the PLA’s formidable missile forces and the large-scale missile production now under way in China, allied forces would initially confront a large missile target set (see Figure 8). Air Sea Battle calls for Air Force and Navy stealthy long-range strike and support platforms,<sup>102</sup> supported by submarine-launched weapons and sensors, to suppress PLA airborne and ground-based components

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<sup>101</sup> In essence, these would be updated versions of the “Wild Weasel” tactics developed by the Air Force during the 1960s to induce SAM sites to activate their radar and expend missiles.

<sup>102</sup> Current Navy strike fighters lack the range to participate in such strikes as long as the PLA A2/AD threat keeps carriers out of strike range. Until carrier air wings include stealthy extended-range manned or unmanned aircraft that can carry out long-range strike missions to enable the carrier to operate outside of the A2/AD threat ring, Navy participation in these missions will likely remain limited to submarine-launched missiles and support for Air Force strike missions. The only Navy aircraft currently under development that could feasibly participate in long-range strike missions from carriers operating outside of the PLA A2/AD threat range is the N-UCAS, which could employ ordnance, ISR, and EW payloads for either strike or support roles.

<sup>103</sup> Attacking from multiple axes greatly complicates the defender's problems for the simple reason that he must distribute his defenses over a wider area. In particular, the allies' ability to penetrate into China from the northeast, where defenses tend to be less dense, would offer significant operational advantages as well as increasing demands on the PLA defenders; hence the importance of extending air superiority from Japan out over the East China Sea.

[illegible]

Source: Sean O'Connor, "Dragon's Fire: The PLA's 2nd Artillery Corps," IMINT & Analysis, entry April 8, 2009, accessed at <http://geimint.blogspot.com/2009/04/dragons-fire-plas-2nd-artillery-corps.html/> on 24 March, 2010; and Sean O'Connor, "Worldwide SAM Site Overview," IMINT & Analysis, entry March 20, 2010, accessed at <http://geimint.blogspot.com/2008/06/worldwide-sam-site-overview.html> on 24 March, 2010.

cueing (perhaps including SOF), would locate and attack mobile missile launchers. Penetrating (i.e., stealthy) platforms would deploy towed and expendable air-launched decoys to suppress air defenses, creating multiple false targets to confuse PLA airborne and surface-based air defense systems, and inducing the PLA to expend surface-to-air missiles and vector interceptor aircraft without effect.

The combination of US standoff and penetrating strike capabilities would create multi-dimensional and multi-directional challenges for PLA offensive missile operations. Sustained attacks using only standoff weapons against known fixed missile sites and C2 infrastructure would degrade the PLA's ability to conduct effective coordinated follow-on strikes against US and allied land bases and maritime targets. However, limiting US missile suppression operations to attacks from standoff distances would create a one-dimensional defensive challenge for the PLA. Furthermore, standoff weapons with long flight times are generally ineffective against mobile missile launchers, which can transition from firing mode to road-march mode and move within minutes. Survivable long-range aircraft that penetrate and persist in defended airspace, on the other hand, have the ability to detect and strike PLA mobile launchers forced to move by standoff attacks, greatly complicating the PLA's offensive missile operations.

The scope and intensity of US stand-off and penetrating strikes against targets in mainland China clearly has escalation implications. The decision to conduct these strikes would likely be taken at the highest political levels of the allied governments. As previously noted, strikes against very high-leverage targets (e.g., PLA ASAT systems) would be essential, not the least for the "scouting battle." Striking other PLA targets in China, however, might be dependent on Chinese actions. For example, if PLA bombardment of a key ally such as Japan went beyond attacking military forces and sought to force Japan out of the war through terror attacks against the populace, or if a major cyber offensive on the US national electric grid were determined to have originated in China, the odds of large-scale strikes against PLA missiles and their launchers would increase.

### *Synergies between Air Force and Navy Capabilities for the Blinding and Missile Suppression Campaigns*

These two lines of operation intertwine. If efforts to blind PLA long-range sensors are successful, the threat from its long-range strike systems is correspondingly diminished. As that threat diminishes, short-range Air Force and Navy ISR and strike assets can be brought to bear.

The synergy between Air Force and Navy capabilities is particularly noteworthy in the nexus between these two lines of operation. Air Force counter-space operations help to restore naval freedom of maneuver by negating PLA space-based ocean ISR. To the extent they are successful, Air Force operations to defend the

US space architecture sustain the space-based functionality critical to effective Navy operations. Correspondingly, the Navy could support Air Force counter-space efforts with its sea-based anti-satellite capability, though such kinetic means generally would not be preferred due to the orbital debris they create. The Navy's missile defense forces could help in defending Air Force operating bases from PLA missile attacks. Navy attacks against PLA IADS and ISR systems from submarines and (potentially) N-UCAS could help enable penetrating Air Force strikes against critical mainland targets. Depending on the target, Navy assets could conduct such strikes as well.

Finally, the PLA's inventory of missiles and mobile launchers is too numerous and generally too difficult to find to realize a high level of destruction. However, by forcing PLA missile forces to increase substantially the amount of time they spend on moving and hiding, it may significantly limit the PLA's ability to launch missile strikes in optimum salvoes. To the extent allied missile defense forces confront a "drizzle" of incoming PLA missiles rather than a "downpour," their effectiveness could improve dramatically, especially if the threat of a saturation ballistic missile attack were eliminated. Moreover, by winning the scouting battle and denying PLA missiles targeting information, the blinding campaign further limits their effectiveness.

### Seizing the Initiative

Assuming China starts the hostilities, it would have the strategic and operational initiative in choosing when, where and how war begins. Given this advantage as well as potentially some measure of operational and tactical surprise, US and allied forces could incur significant and perhaps severe losses.

Initial US and allied efforts would therefore focus on preventing the PLA from scoring a "knock-out blow" that would result in a quick victory. Priority would be given to defending and aiding Japan and other security partners, US forces would also move to rapidly blunt PLA efforts to win the scouting battle by both blinding PLA forces and successfully maintaining US C2, communications and ISR connectivity. This would have to be accomplished either through successful defense of the US space architecture or by establishing adequate battle network alternatives. Finally, US and allied forces would begin operations aimed at destroying or degrading key PLA A2/AD capabilities.

Following the initial Chinese attacks, over succeeding weeks and months US and allied forces would focus on seizing the initiative in all warfare domains. The priority here would be on continuing the operations described above and on suppressing PLA missile attacks against both naval and land targets, particularly in Japan. The missile suppression campaign would employ standoff and penetrating strikes, supported by submarine and carrier-based anti-IADS strikes and

Initial US and allied efforts would focus on preventing the PLA from scoring a "knock-out blow" that would result in a quick victory.

Over succeeding weeks and months US and allied forces would seize the initiative in all warfare domains.

EW platforms.<sup>104</sup> Emphasis would also be given to reinforcing Japanese air and missile defense forces by US assets to maintain air superiority over Japan and extend it over the East China Sea and then down the Ryukyus island chain.

At sea, the ASW campaign would be critical to dismantling a principal portion of the PLA's ASCM threat. Reducing the PLA ASCM-armed warship threat also reduces the number of potential missile shooters, which in turn increases the freedom of maneuver of US and allied naval forces. Maritime patrol aircraft armed with ASW ordnance and able to patrol large maritime areas would support submarine and surface ship ASW operations. Anti-surface warfare operations against PLA combatants, particularly ASCM shooters, would be conducted principally by land-based maritime strike aircraft equipped with stand-off anti-ship weapons.<sup>105</sup> The objective of the ASUW operations would be to turn the waters inside the First Island Chain into a metaphorical "No Man's Sea"<sup>106</sup> until such time as the ASW and ASUW campaigns had rendered the PLA's A2/AD threat sufficiently attenuated to permit US and allied operations there.<sup>107</sup>

To sum up, following the defense against the initial PLA attacks, and the commencement of the blinding and missile suppression operations, US and allied actions would emphasize:

- > Enhancing the air and missile defense of Japan, and extending air superiority over the East China Sea and down the Ryukyus island chain;
- > Conducting sustained standoff and penetrating strikes, using multiple attack axes, against PLA ballistic missile targets (including missile production and storage facilities) as well as strikes to re-attack new or repaired counter-space and long-range sensors sites;
- > Conducting ASUW operations—led primarily by US and allied airborne forces—to deny PLA warships access to the East and South China Seas;
- > Continuing the ASW campaign inside the First Island Chain (principally with submarines complemented by airborne offensive mining missions using stealthy Air Force bombers), while maintaining ASW barrier operations; and

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<sup>104</sup> Again, this assumes that future carrier air wings will comprise stealthy long-range strike and support aircraft, such as the N-UCAS.

<sup>105</sup> Such aircraft would be the preferred means. Their employment would help to conserve SSN torpedoes, which are key to keeping US and allied submarines on-station as long as possible before they have to return to reloading sites.

<sup>106</sup> This of course plays on the World War I term, "No Man's Land," which was the uninhabitable area separating the two sides' trenches.

<sup>107</sup> The ASUW and ASW sub-campaigns would have considerably different timelines. The ASUW effort could proceed relatively quickly, especially if aircraft were carrying most of the maritime strike burden. The ASW sub-campaign by contrast would be much slower. It would therefore be the pacing sub-campaign in terms of enabling US and allied operations closer to China's littorals.



- > Continuing the scouting battle through the attrition of PLA airborne ISR and communications relay assets.

Aside from its key role in winning the scouting battle, allied air superiority also makes a major contribution to the ASW campaign. As allied air superiority is steadily extended over greater areas, they become safe for fixed-wing air ASW assets to operate, thus adding significantly to the allies' ASW capability along the Ryukyus barrier. The ASW campaign in turn would steadily reduce the number of ASCM-armed submarines threatening allied warships and commercial traffic. As the ASW campaign achieved increasing success, allied submarines would become increasingly available to assist with other missions.

The following sections discuss some of these operations in greater detail.

### *Retaining Air Superiority over Japan and Extending It over Outlying Waters*

The principal immediate threat to bases and facilities in Japan would be posed by the PLA's ballistic missile force. However, PLA strike aircraft armed with land-attack cruise missiles and other stand-off ordnance also represent a significant threat, particularly to western Japan and the Ryukyus. Thus extended-range air defense of Japan would be a key AirSea Battle mission at the onset of a conflict. The bulk of Japanese and US fighters would operate from bases in eastern Japan, since bases further west would be more vulnerable to PLA attacks.

If the PLA commits significant numbers of strike aircraft to attacking targets in Japan, the opportunity may present itself for the allies to attrite PLA air order of battle. To the extent such PLA strike aircraft also had a maritime strike capability, their attrition over time would reduce the threat to allied naval platforms. Early reinforcement of JASDF fighters by US fighters would increase such attrition, and reduce the need for US and Japanese surface-to-air missiles, thereby conserving them for use against PLA incoming missiles.

Assuming these allied operations were successful, Japanese and US air forces would extend air superiority out over the East China Sea, and down the Ryukyus island chain, where several Japanese airstrips, if improved, could support such operations. To sum up, this extension of allied air superiority operations would have several objectives, including:

- > Achieving local air superiority against PLA third- and fourth-generation fighters, including the Sukhoi Su-30MKK and indigenously-produced J-10;
- > Continuing the attrition of PLA air strike assets;
- > Protecting airborne ISR platforms to enable the establishing/maintaining of maritime domain awareness in support of sea-denial and ASW operations (see Figure 9 below);



- > Enabling maritime strike operations against PLA surface units as part of allied sea-denial operations (see below); and
- > Helping to set the conditions for penetrating raids into or via Northeastern China, including recurrent probes of PLA IADS to induce SAM expenditures (e.g., by using low-cost unmanned decoys) and strikes against advanced SAM systems in support of penetrating strike missions.

### *Denying PLA Surface Warship Access to the East and South China Seas*

**AirSea Battle relies heavily on airborne maritime strike platforms armed with air-launched ordnance as the optimal means for destroying PLA surface combatants.**

Area denial of the maritime domain is a PLA priority. Consequently AirSea Battle finds US and allied forces seeking to deny the PLA surface forces, especially those equipped with ASCMs, the freedom to operate in open waters.

AirSea Battle employs several means to accomplish this. For reasons elaborated upon below, while submarines are generally the most lethal ship killers, their small numbers and payloads, as well as their allocation to other priority missions, limits their employment in anti-surface warfare operations, save against very high-value targets. Submarines could, however, provide contact and targeting data to other allied platforms, especially as friendly surface ships would no doubt find it too risky to close within range of PLA ships armed with ASCMs.<sup>108</sup>

Given these considerations, along with the large search areas required to cover the East and South China Seas, and the high number of contacts that would need to be evaluated, AirSea Battle relies heavily on airborne maritime strike platforms armed with air-launched ordnance as the optimal means for destroying PLA surface combatants. Allied stand-off weapons such as ASCMs would be preferred against PLA warships armed with potent long-range air defense systems or operating under the cover of land-based IADS. However, many PLA ASCM-armed missile platforms, such as small missile-firing craft like *Houbei*-class missile boats, while dangerous threats to surface ships, have little or no air defense capabilities. They would be easy prey for allied strike aircraft employing far less expensive non-stand-off ordnance.

Until the point was reached where PLA commanders concluded their surface warships were no longer survivable underway against US and allied maritime strikes, and surviving vessels were kept in port,<sup>109</sup> there would be many PLA surface targets to attack. While US carrier strike aircraft naturally have a maritime

<sup>108</sup> US warships currently are limited to HARPOON surface-to-surface missiles, subsonic ASCMs that have considerably shorter range than many advanced foreign ASCMs available on the market. See [http://www.navy.mil/navydata/fact\\_display.asp?cid=2200&tid=200&ct=2](http://www.navy.mil/navydata/fact_display.asp?cid=2200&tid=200&ct=2). The US Navy had 250 nm range Tomahawk Anti-Ship Missiles (TASM) in the 1980s, but removed them from service (converting many to land-attack versions) after the end of the Cold War.

<sup>109</sup> Making Chinese commanders believe that sending out their ships would result in their probable loss would no doubt be easier than actually killing them. The Royal Navy was able to do this successfully against Argentina in the 1982 Falklands War.

strike role, with the potential exception of long-range air platforms like N-UCAS, they would likely lack the range to strike most PLA ships during the initial stages of the conflict when the PLA's A2/AD network remained relatively intact. In the past, Air Force aircraft also have been assigned maritime strike missions, but training and funding to support this mission have generally been accorded low priority.<sup>110</sup> Various Air Force platforms, including strike fighters that survive the PLA's initial attacks on allied forward bases, UAVs, and bombers could be fitted with the requisite systems to enable maritime strikes. Of these, the first two would carry smaller payloads and the priority for fighters in their interceptor role may be much higher than that accorded to the anti-ship strike mission, particularly in the early stages of the conflict. Bombers, on the other hand, with their greater endurance and much larger payloads, could prove far more useful in the maritime strike role, assuming that they are properly equipped and their crews suitably trained for the mission. They could form AirSea Battle anti-surface "hunter-killer" groups, receiving targeting information from on-board systems and other platforms such as submarines, maritime surveillance aircraft, and ISR UAVs, and providing the maritime equivalent of the "on-call" fires they provide for ground forces. Assuming that friendly forces can protect them against PLA interceptor threats, anti-ship strikes could become an important mission for non-stealthy bombers that would not be survivable for other, more traditional missions in the face of robust enemy IADS.

The AirSea Battle campaign to neutralize PLA submarines is key to regaining US and allied freedom of action.

### *Defeating the PLA Submarine Force and Maintaining Undersea Access within the First Island Chain*

The AirSea Battle campaign to neutralize PLA submarines is key to regaining US and allied freedom of action (see Figure 9).<sup>111</sup> Chinese submarines armed with long-range ASCMs, and supported by off-board targeting are a key element of the PLA maritime A2/AD threat.<sup>112</sup> In addition to employing ASCMs to help keep US high-value surface warships beyond effective range of US allies in East Asia (and destroying them if possible), the PLA submarine force could conduct selective attacks against critical allied land targets to complement PLA ballistic missile strikes, assist with battle damage assessments if other PLA ISR assets are unavailable, and conduct attacks against US and allied SLOCs to force a substantial diversion of scarce ASW resources. On the other hand, US and allied submarine

<sup>110</sup> For example, during the Cold War, B-52s were able to carry HARPOON ASCMs, and occasionally participated in joint training exercises.

<sup>111</sup> Lyle Goldstein and Bill Murray, "China's Subs Lead the Way," *Proceedings*, March 2003, Vol. 129/3/1, 201, which can be accessed at [http://www.usni.org/magazines/proceedings/archive/story.asp?STORY\\_ID=649](http://www.usni.org/magazines/proceedings/archive/story.asp?STORY_ID=649).

<sup>112</sup> The principal danger posed by the PLA submarine ASUW threat comes from remotely-targeted ASCMs rather than from torpedoes. While the latter are the most potent ship killers, they would have to be fired from positions close enough to their targets that escort ships' ASW systems would likely have higher probabilities of detection and kill.

**FIGURE 9. PRIMARY AREAS OF US SUBMARINE AND ANTI-SUBMARINE OPERATIONS**

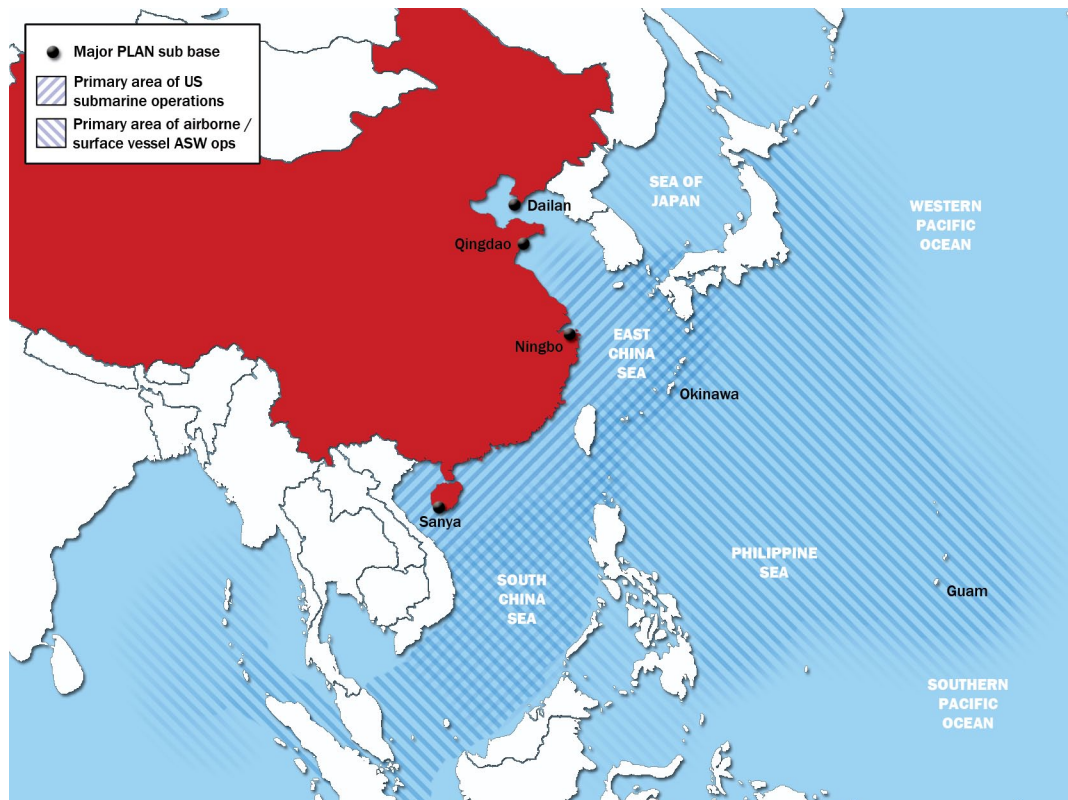


Image: CSBA

forces (except SSGNs) would likely have ASW as their principal mission, with US submarines also capable of conducting concurrent strike and ISR missions.

Further complicating the allies' predicament, given the low acoustic signatures of modern PLA submarines, it cannot be assumed that open ocean ASW operations would be very successful. The noisy littoral waters within the First Island Chain are even less encouraging for conducting prompt, successful allied ASW operations.

AirSea Battle's first step in countering the undersea threat is limiting the number of PLA submarines that can deploy to the Western Philippine Sea where they can threaten US and Japanese naval operations and the SLOCs to and from Japan, as well as to the Republic of Korea and Taiwan. AirSea Battle exploits the allies' geographic position and advantage in hydrography to establish anti-submarine barriers along the Ryukyus, and across the Luzon Strait through the Philippine Islands and southern exits from the South China Sea. The PLA submarines' need

to pass through such natural chokepoints could constitute a significant challenge for them, assuming US and Japanese ASW planners take the actions necessary to exploit their advantage. Japanese submarines and other Japanese ASW forces, including air ASW platforms and undersea arrays, could prove particularly important in establishing and maintaining the “Ryukyus Barrier.” While PLA submarines might well deploy prior to the onset of a crisis, they have relatively limited times on station (measured in weeks), and are further constrained by their slow transit speeds, small payloads and, in many cases, lengthy transits to their patrol areas. Their relatively short on-station times require them to return frequently to their bases for rearming and refueling. They would be most vulnerable to attack during such transits as they crossed allied ASW barriers and entered and left their bases.

The AirSea Battle ASW campaign emphasizes ambushing PLA submarines during these periods of heightened vulnerability. Allied submarines, advanced “smart” mobile mines, and armed unmanned undersea vehicles (UUVs)<sup>113</sup> lead the effort in the ASW campaign. Offensive mining appears particularly attractive, given its comparatively low cost and the difficulty and time-consuming nature of countermine operations. However, these capabilities—armed UUVs and mines—will likely need to be deployed almost exclusively from submarines, as they represent the allies’ only highly survivable maritime asset during the conflict’s early stages. Given the theater’s enormous size and the submarines’ comparatively small payloads, establishing effective minefields near all PLA submarine bases would require a prolonged effort if submarines alone were assigned the mission.<sup>114</sup>

In light of this, AirSea Battle also employs Navy *and* Air Force aircraft in the ASW mission. Maritime patrol aircraft (MPA) remain important assets for open-ocean ASW operations.<sup>115</sup> Air strikes by stealthy penetrating bombers against submarines in port are a possible option, though most PLA submarine bases afford hardened protection (e.g., tunnels dug into hard rock formations). Stealthy bombers could also be used to lay mines, and could prove particularly effective in that role, given their large payloads.

The AirSea Battle ASW campaign would likely last months. As the reduction and eventual elimination of the PLA submarine threat must be accorded a high

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<sup>113</sup> The Navy is developing UUVs for various missions, and is exploring future concepts that include use of armed UUVs. See Edward Whitman, *Unmanned Underwater Vehicles: Wave of the Future*, *Undersea Warfare*, Vol. 4, No. 3, Summer 2002, accessed at [http://www.navy.mil/navydata/cno/n87/usw/issue\\_15/contents.html](http://www.navy.mil/navydata/cno/n87/usw/issue_15/contents.html).

<sup>114</sup> As a rule of thumb, submarines can carry two mines for every torpedo.

<sup>115</sup> While the probability of submarine detection is likely to remain low, MPA serve the important function of forcing diesel submarines to remain submerged to avoid radar or visual detection, thereby greatly reducing their speed and lengthening their transit times.

AirSea Battle priority, a large proportion of available US and allied submarines should be dedicated to the ASW campaign for a prolonged period. Perhaps somewhat paradoxically, the more submarines assigned to this campaign, the sooner they could be released for other missions.

For AirSea Battle to succeed,, US and allied submarines must be able to conduct their missions inside the First Island Chain at acceptable levels of risk, to include recurrent pre-war undersea ISR to maintain awareness of any PLA undersea sensor (and potentially weaponized) arrays in key areas where future operations are planned. Rapid neutralization of these arrays early in the conflict is essential to the ASW campaign described above.

### Follow-On Operations

The first-stage lines of operation would set the conditions for second-stage operations in the event of a protracted war. Some of these follow-on operations might begin during the initial stage of operations, but would now assume much greater priority.

Such follow-on operations would include:

- > Continuing SLOC protection and convoy escort missions, including resupply of forward bases and operating elements, until the PLA ASW threat had been substantially attrited;
- > Securing “rear areas” by neutralizing any PLA units forward-deployed to such areas;
- > Establishing a “distant blockade” to interrupt Chinese seaborne commerce; and
- > Cutting off or seizing Chinese offshore energy infrastructure.

### *Sustaining a Protracted Campaign*

As US and allied forces work to seize the operational initiative, they would also be setting the conditions for waging a successful protracted campaign. The United States would steadily augment its forces in theater while restoring degraded bases and capabilities. Given that the expenditure rates of both offensive precision-guided and defensive munitions would most likely be very high, the US defense industrial base would undertake surge operations to replace expended ordnance.

Even though US and allied forces would be presumed to have seized the initiative from the PLA by this point, this would not necessarily mean the end of the conflict was approaching. Indeed, it would remain a difficult task to accurately assess whether and what particular parts of the A2/AD threat continued to function. Given the lethality of certain systems, it could remain the case that

commanders still would not risk very-high-value units such as carriers within the range of the PLA's most potent systems. Moreover, the PLA would continue to make every effort to restore degraded capabilities. Thus US and allied forces would need to continue the efforts undertaken in the initial phase of operations (e.g., suppressing PLA ballistic missiles, maintaining ASW operations; providing ballistic missile defense, etc.) even while ramping up Stage II protracted campaign operations.

The allies' most effective operation could be a distant blockade of China. Whereas the United States has a major asymmetric advantage in that it would be able to maintain the vast bulk of its prewar overseas trade, a large proportion of Chinese trade would be essentially cut off. As shown both in World War I against Germany and in World War II against Japan, strangling an enemy's foreign commerce can prove crucial, and perhaps even decisive, in winning the war.

### *Carrying Out Peripheral Operations to Secure "Rear Areas"*

Over the past several years, China has helped develop port facilities in places like Gwadar (Pakistan), Chittagong (Bangladesh), and Sittwe (Burma) that could be used for military purposes. It recently deployed naval forces off Somalia in conjunction with anti-piracy operations for the first time, and PLA officials have floated trial balloons about acquiring access to forward bases<sup>116</sup>. It continues to wage vigorous "dollar diplomacy" with various statelets in Oceania that could eventually translate into access to facilities for military purposes.<sup>117</sup> In short, China appears to be developing options for creating a network of overseas military bases stretching from Africa to Oceania. Such presence would be consistent with the actions of many other rising powers throughout history; however, it could have serious implications for the military balance and consequently for US security and the security of its allies.

Preserving a stable military balance under these conditions would necessarily require the United States and its allies to maintain the capability to neutralize PLA bases outside the Western Pacific. This would involve removing the threat of diversionary PLA operations.

Such peripheral operations could take some time to complete, given the large distances between theaters of operation. Still, the United States and its allies

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<sup>116</sup> Dean Cheng, "The Chinese Navy's Budding Overseas Presence," *WebMemo*, Heritage Foundation, January 11, 2010, which may be accessed at: <http://www.heritage.org/Research/Reports/2010/01/The-Chinese-Navys-Budding-Overseas-Presence>

<sup>117</sup> "Dollar diplomacy" refers to the use of financial incentives such as foreign aid or low-interest loans to gain political influence with recipient nations. See, for example, Thomas Lun and Bruce Vaughn, "The Southwest Pacific: US Interests and China's Growing Influence," Congressional Research Service, July 6, 2007, and Bertil Lintner, "A New Battle for the Pacific," [http://www.asiapacificms.com/articles/china\\_pacific/](http://www.asiapacificms.com/articles/china_pacific/).

would enjoy two important advantages. First, assuming the US fleet controls the seas, allied forces could take the lead in many of these peripheral operations, with US forces in support. For example, Australia is the most powerful state near Oceania, and has highly capable military forces that could conduct operations to neutralize any small PLA forces in the region. Second, US forces (e.g., amphibious units) that are highly vulnerable against the PLA A2/AD battle networks, could be employed to good effect in the campaign to secure the periphery. As isolated PLA forces are eliminated, the allied forces conducting these operations would be freed up for employment against (hopefully) a weakened PLA A2/AD capability.

### *Implementing “Distant Blockade” to Interrupt Chinese Commerce*

In the event of a protracted conflict, choking off Chinese seaborne commerce to the maximum extent possible would likely be preferred to conducting large-scale operations in China itself. While considerable attention has been paid to Chinese dependence on seaborne energy flows, it is generally considerably overstated.<sup>118</sup> Instead, comprehensively blocking maritime shipping in and out of Chinese ports, i.e., halting trade, would have a much greater effect (see Figure 10).

An AirSea Battle blockade would not resemble the anti-commerce warfare and blockade that the United States conducted against Japan during World War II. Whereas US submarines sought to destroy Japanese merchant shipping wherever it could be found, and operated close to Japan almost from the start of the Pacific War, in AirSea Battle US submarines would be assigned other, higher-priority missions as described above. Moreover, as other types of interdiction platforms (such as surface warships and non-stealthy aircraft) would be highly vulnerable operating within effective range of the PLA A2/AD systems, a “close blockade” is impractical.

Instead the US forces could exploit the Western Pacific’s geography, which effectively channelizes Chinese merchant traffic. Since direct Chinese commerce with the United States and Japan would cease at the outbreak of conflict, there would be little if any trans-Pacific traffic left to intercept. Most interdiction efforts would focus on ships trying to transit the South China Sea. Traffic bound for China would be intercepted as it tried to enter the southern portions of the South China Sea, i.e., beyond range of most PLA A2/AD systems, from the Malacca, Singapore, or major Indonesia straits.

Rather than the mass sinkings of merchant ships by German U-boats and their US counterparts during World War II, US and allied forces might conduct maritime

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<sup>118</sup> See, for example, <http://www.eia.doe.gov/cabs/China/Background.html>. For a detailed discussion of the possible impacts of an “energy blockade” of China, see Gabriel Collins and William Murray, “No Oil for the Lamps of China?” *Naval War College Review*, Vol. 61, No. 2 (Spring 2008), pp. 79–95.



FIGURE 10. SHIPPING ROUTES TO CHINA

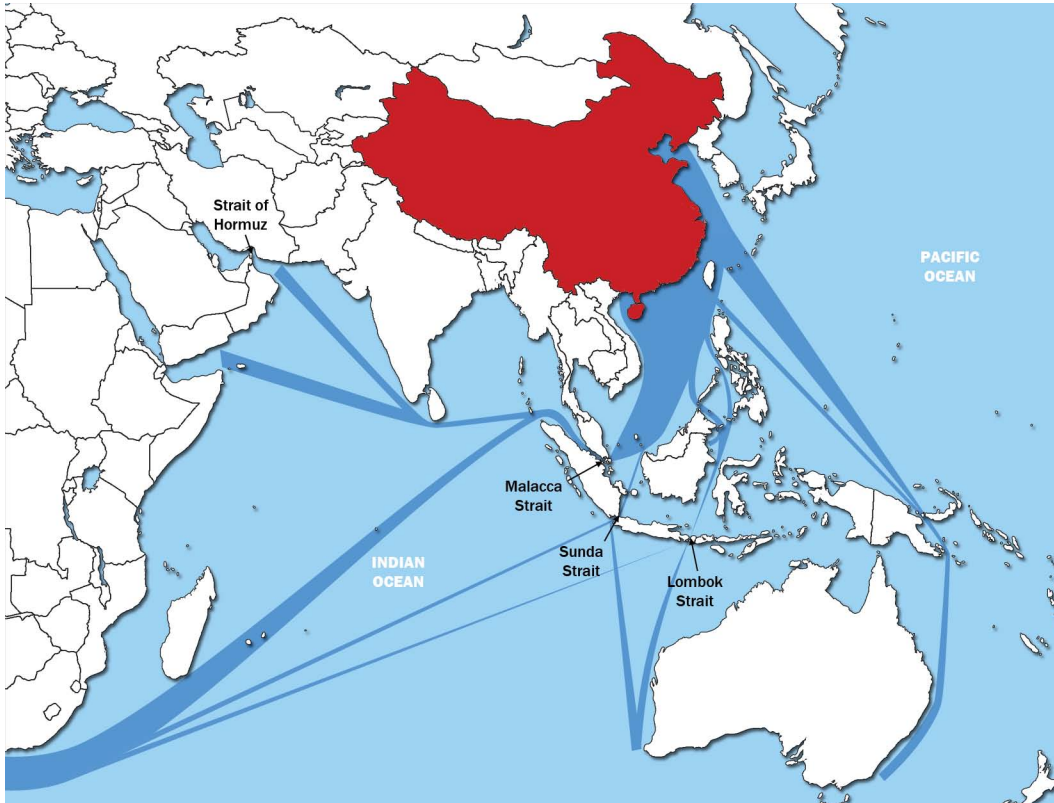


Image: CSBA

interception operations (MIO) against ships bound for China. Economically (and environmentally<sup>119</sup>) it would be far more beneficial to seize (and perhaps confiscate) prize cargos than sink them. The option to use force against non-compliant ships would be retained.

Interdiction operations would be resource-intensive. But since they generally would not involve major combat, allied aircraft and ships too vulnerable for employment against the PLA's A2/AD battle network would be both suitable and available for such operations. These forces would patrol key chokepoints in Southeast Asia as the central element in a distant blockade.

However, many of the platforms most suited for this kind of operation, such as Littoral Combat Ships (LCS), patrol craft and small frigates, do not carry ordnance sufficiently heavy to stop larger ships determined not to halt and be boarded. Those

<sup>119</sup> Environmental factors would be secondary in the context of a major conflict, but the consequences of destroying certain cargoes (e.g., oil tankers) could be quite severe and worth avoiding when possible.



Navy ships that do would be likely to have higher priority taskings, and thus would not generally be available to support MIO operations. However, Air Force bombers with their large payloads and long endurance could provide “on-call” maritime strike. These bombers could be assigned to support MIO operations and conduct strikes on PLA vessels or cargo ships as needed.

Lastly, “distant blockade” operations could also require two additional operations: disrupting Chinese undersea telecommunications lines; and seizing or destroying of Chinese undersea energy infrastructure and/or disrupting undersea energy flows to China.

### *Sustaining Operational Logistics*

Given the threat posed by PLA forces and the current US forces called for in the Defense Department’s Program of Record, US forces will confront significant operational logistics liabilities in the WPTO. These stem from the vulnerability of the relatively small number of US Western Pacific bases and those situated in the Ryukyus and Western Japan; the increased burden on the aerial refueling fleet if those bases become unusable; and the small size of the peacetime combat logistics force (CLF). Navy warships, especially submarines, carry small payloads relative to their potential taskings, and cannot rearm with missiles or torpedoes while underway. This limitation is exacerbated further by these ships’ inability to use vulnerable forward bases and facilities to rearm.

These vulnerabilities suggest the need to implement various offsetting measures. First, vital bases like Guam should employ active and passive defenses both to reduce damage to assets on the ground and to increase the number of PLA missiles required to achieve the desired destructive effects in order to deplete the PLA inventory of longer-range missiles more quickly.<sup>120</sup> Rapid repair and remediation capabilities to restore minimal base functionality would be essential, as would the creation of a rapid base development capability<sup>121</sup> for use once PLA ISR systems were substantially neutralized. As noted above, denying the PLA BDA is central to winning the “scouting battle,” both to deplete PLA missile inventories further and to reduce the chances that new missile attacks will catch valuable assets on the ground. Using operational deception techniques to suggest facilities were back in operation and hosting forces even when they were not could also prove useful.

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<sup>120</sup> This would be less useful in cases of bases situated much closer to China, e.g., Kadena, since the PLA’s inventory of shorter-ranged missiles (plus air strike capabilities), being far larger, is not as vulnerable to allied exhaustion tactics.

<sup>121</sup> This capability has atrophied since World War II, when the US Navy’s Construction Battalions (CBs, or “Sea Bees”) constructed air strips at a record pace behind US forces advancing along the Western Pacific island chains. See William Bradford Huie, *Can Do! The Story of the Seabees*, (Naval Institute Press, 1997).

Second, given the possible temporary or protracted unavailability of major US Western Pacific island bases, the value of obtaining access to bases and facilities for logistical and maintenance purposes in areas such as eastern Japan, Australia, Singapore, and possibly other partner states (e.g., India, the Philippines, Vietnam) would increase commensurately.

Third, SLOC defense between the United States and its forward-deployed forces could absorb considerable US and allied ASW forces as long as the PLA submarine threat remains significant.<sup>122</sup> Given that US forces must transport all or nearly all their needs into the WPTO, logistics throughput will remain critical to sustaining operations. In particular, allied ASW operations near the approaches to forward bases would remain particularly important to assure their resupply. As PLA submarines, particularly nuclear and long-range conventionally powered submarines, were attrited, resources dedicated to protecting friendly shipping could be reduced. Japanese SLOCs would be rerouted further north, well away from the reach of most PLA A2/AD systems. However, JMSDF units would still need to provide ASW protection for shipping approaching Japanese ports. Australian SLOCs would be a lesser concern. It would be significantly more difficult for PLA submarines to threaten these seriously on a sustained basis due to the great distances from their bases to these SLOCs.<sup>123</sup>

Fourth, the allies' dependence on long SLOCs while the PLA submarine threat remained significant could be mitigated to some extent by stockpiling war reserve materials such as caches of munitions, maintenance spares, and POL in forward areas such as Australia, Hokkaido, Singapore, the Aleutians, and Hawaii.

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This chapter has described a candidate AirSea Battle campaign and its key components and requirements. Executing such a campaign would require capabilities that, in some cases, differ considerably from those in the Defense Department's Program of Record. Indeed, many of the operations and measures explored assume various adjustments to the defense program, many of which would have to be initiated in the near-future.

The next chapter discusses some candidate "piece-parts" of an AirSea Battle concept. They constitute a rough contemporary equivalent of the metaphorical "31 initiatives" that emerged from the AirLand Battle effort some thirty years ago.

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<sup>122</sup> Hence the importance of the ASW campaign as it affects other operations; as PLA submarines are attrited, this threat would progressively diminish.

<sup>123</sup> Given that the United States is the principal guarantor of security in the region, it seems almost certain that PLA anti-SLOC efforts would be concentrated principally against US logistics flows.



## CHAPTER 4 > **CANDIDATE AIRSEA BATTLE “PIECE-PARTS”**

The Defense Department’s Program of Record forces and current concepts of operations do not accord sufficient weight to the capabilities needed to successfully execute an AirSea Battle campaign like the one described in this report. This chapter offers some suggestions on how to close this gap between programmed capabilities and AirSea Battle operational requirements.

For simplicity, this section is organized into the following broad categories: operational; organizational; and technological/materiel. A final section addresses issues that bear on an AirSea Battle concept but which fall outside of the purview of the Air Force and/or the Navy.

### **Operational**

The following initiatives exploit or increase US operational advantages and opportunities and mitigate US vulnerabilities and risks at the operational level of war.

#### *1. Initiatives on Mitigating the Missile Threat to Guam and Other Selected Bases:*

- a. The Air Force should selectively harden facilities on Guam and some additional sites in order to complicate PLA targeting challenges. Due to the considerable expense involved with hardening, a comprehensive effort is impractical. Moreover, hardening by itself would be insufficient to ensure continued base operations in the face of large PLA missile inventories. Thus hardening plans should be considered only within the context of an integrated effort, as described earlier in this report, for defending US and allied forward bases.
- b. The Air Force should refurbish smaller bases at locations such as Tinian, Saipan and Palau sufficiently to support bare-base air operations if

Anderson AFB on Guam is not available. This would require stockpiling petrol, oil, and lubricants (POL) and munitions, and other items to enable bare-bones aircraft sortie generation. Running undersea fuel pipelines between Guam, Tinian and Saipan should be studied as a potential way of reducing the need to stockpile fuel on the satellite bases or resupply them using vulnerable tankers.

- c. The Air Force should increase its rapid runway repair capacity at Guam and its satellite bases.
- d. The Navy should harden its Guam port facilities (especially those used for fuel transfer from tankers) to the extent possible, recognizing that such assets are inherently fragile. Basic construction and repair materials sufficient to support post-attack recovery efforts should be prepositioned on the island.
- e. The Air Force and the Navy, in conjunction with Army ground-based missile defenders, should develop and routinely exercise joint plans for integrated ground-, air-, and sea-based missile defense of US bases in the WPTO. Similar plans should be developed and exercised with Japanese BMD forces to defend targets in Japan and create and maintain allied BMD interoperability.<sup>124</sup>
- f. The Air Force and Navy should jointly assess potential tactical air-based BMD systems such as the Air-Launched Hit-to-Kill (ALHK) concept, directed-energy defenses, and associated doctrine and tactics. With respect to the former, both manned and unmanned launch platforms should be explored. Navy versions should be capable of operating from carriers. If the joint assessment concludes the capability has promise, the Air Force and Navy should jointly develop and field it.

## *2. Initiatives on Correcting the PLA-US Imbalance in Long-Range Strike for Time-Sensitive Targets:*

- a. The Air Force and Navy should invest in a long-range strike capability against time-sensitive targets. US military forces in the WPTO confront a Chinese military that relies very heavily on short-, medium-, and intermediate-range ballistic and cruise missiles, all with very short flight times. Ballistic missiles are also both difficult and costly to defend against. Thus the imposition of similar defensive requirements on the PLA could impose similar costs. Moreover, in this case the asymmetry in potential fixed

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<sup>124</sup> Such combined US-Japanese BMD planning exists nominally. In reality, various alliance and Japanese domestic political considerations (e.g., interpretations of Article 9 of the Japanese constitution) prevent genuine BMD interoperability. This poses a serious risk to successful defense even against a much weaker threat from North Korean ballistic missiles.

targets would work to US advantage, in that while the PLA would have only a relatively small number of US targets to attack (e.g., forward bases), US forces could hold a much larger target set at risk.

- b. The Navy should consider investing in conventionally-armed, relatively short-range<sup>125</sup> sea-based IRBMs to further complicate PLA planning.<sup>126</sup> Depending on missile technical characteristics, both submarines and surface ships (not necessarily combatants) could serve as potential firing platforms.<sup>127</sup> Ballistic missile striking power should be distributed across a large number of platforms similar to the way Tomahawk land-attack cruise missiles distributed Navy strike power that had previously been concentrated in a small number of aircraft carriers. An ASBM variant should also be considered.

### 3. *Initiatives on Finding and Attacking High-Value Mobile Assets:*

- a. The Air Force and Navy should develop and field long-range next-generation low-observable air platforms, both unmanned and manned/optionally manned. The Navy variants should be capable of operating from carriers.
- b. The Air Force and Navy should jointly develop various payloads for these platforms, including precision-guided strike weapons, ISR sensors, advanced air-to-air missiles, decoys of various kinds, electronic attack systems and, eventually, directed-energy weapons.

### 4. *Initiatives on Developing and Fielding Greater Penetrating and Stand-off Long-Range Precision-Strike Capabilities and Capacities:*

- a. The Air Force and Navy should jointly<sup>128</sup> develop a long-range precision-strike family of systems that consists of ISR, airborne electronic attack,

<sup>125</sup> Such proposed IRBMs nominally would have a range of under 1,000 km, so that their flight profiles would be distinctly different from those of SLBMs and ICBMs, thereby reducing the chances that PLA defenders could mistake them for nuclear-armed missiles.

<sup>126</sup> Note that the Intermediate-Range Nuclear Forces (INF) Treaty covers only ground-based systems.

<sup>127</sup> It may even become technically feasible to bring significant numbers of missiles into theater using towed modules, or even to place them on and fire them from the sea bottom. See, for example, [http://www.navy.mil/ navydata/cno/n87/usw/issue\\_8/future\\_force.html](http://www.navy.mil/ navydata/cno/n87/usw/issue_8/future_force.html). However, existing arms control treaties restrictions may limit this. See [http://www.ntip.navy.mil/sea\\_bed\\_arms\\_control\\_treaty.shtml](http://www.ntip.navy.mil/sea_bed_arms_control_treaty.shtml).

<sup>128</sup> This is not to say that the Navy should be deeply involved in every aspect of such a “family of systems,” e.g., with development of a long-range land-based bomber. However, it would be of critical importance both operationally and economically that systems such as ISR sensors, electronic attack systems, and precision strike ordnance be compatible and interoperable from design through fielding, which would entail significant Navy participation in the relevant R&D.

and strike assets (see Figure 11 for ranges of current long-range systems).<sup>129</sup> Against potent A2/AD battle networks, synergistic employment of such systems would be a prerequisite for degrading an adversary's IADS, ISR, and C2 networks. In particular, penetrating, persistent airborne electronic attack platforms would increase the survivability of stand-off munitions and penetrating aircraft striking fixed and mobile targets in contested airspace.

- b. The Air Force should develop a survivable multi-mission, long-range persistent strike platform as part of the above family of systems. The platform, unmanned, manned, or optionally manned, should have on-board surveillance and self-defense capabilities to enable autonomous operations against fixed and mobile targets in degraded C2 environments.
- c. The Navy should expedite developing, experimenting with, and fielding a carrier-based UCAS system designed to operate either independently or in conjunction with manned platforms.
- d. The Air Force and Navy should jointly develop future-generation stealthy long-range land-attack cruise missiles capable of carrying a wide variety of payloads to replace today's Tomahawk (TLAM) and Air-Launched Cruise Missiles (ALCM).<sup>130</sup>

<sup>129</sup> A CSBA study on the Long-Range Strike family of systems will be published later this year.

<sup>130</sup> Historically, the cost of developing such weapons has been high. However, TLAMs and ALCMs are aging and becoming increasingly vulnerable to sophisticated missile defense, hence must be replaced at some point.

**FIGURE 11. CURRENT (AND PROSPECTIVE) US LONG-RANGE STRIKE SYSTEMS (COMBAT RADIUS, UNREFUELED)**

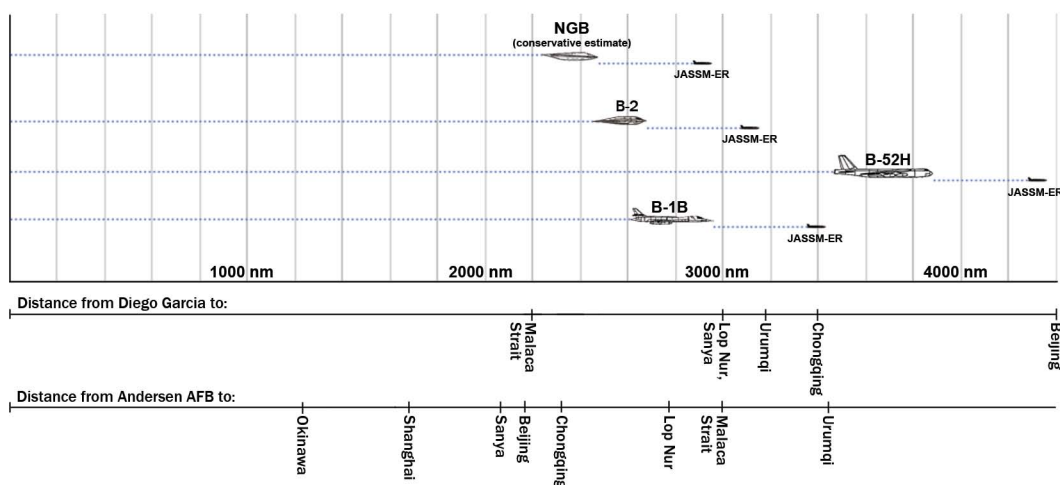


Image: CSBA

- e. The Air Force and Navy should alter the current ratio (roughly 20:1) of planned investments in short-range strike relative to long-range strike to favor long-range strike.

### 5. *Initiatives on Enhancing Maritime Strike Capacity:*

- a. The Air Force should equip many of its large long-range platforms and train their crews (if manned), in conjunction with the Navy, for maritime strike missions, including direct support of naval units conducting missions such as MIO and blockade enforcement.
- b. The Air Force and Navy should develop the necessary joint C2 mechanisms and tactics to enable Air Force platforms to target and engage hostile surface targets in conjunction with Navy ISR and targeting systems, including maritime patrol aircraft.
- c. The Air Force and Navy should jointly develop a long-range anti-ship missile that can be employed from manned and unmanned air platforms as well as from ships and submarines.<sup>131</sup>
- d. The Air Force and Navy should routinely conduct joint maritime strike mission planning, training and exercises.

### 6. *Initiatives on Regenerating Airborne Offensive Mining Capacity:*

- a. The Air Force should equip its stealthy large long-range/long-endurance platforms with an offensive mine-laying capability and train its crews (if manned), in conjunction with the Navy, for offensive mine laying missions within the PLA's A2/AD umbrella.<sup>132</sup>
- b. The Air Force and Navy should routinely conduct joint offensive mining planning, training and exercises.

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<sup>131</sup> The Tomahawk Anti-Ship Missile (TASM) was withdrawn from service in the 1980s in part because the maritime targeting systems of the day were not good enough to exploit the missile's 250 nm range. Today's mix of targeting systems and methods are far more capable, and will undoubtedly continue to improve in the future.

<sup>132</sup> Offensive mining will generally only be effective in areas close to hostile territory, near the approaches to ports and naval bases. Thus stealthy mine-laying platforms capable of penetrating within A2/AD systems are preferred for conducting this mission. Submarines have offensive mine-laying capabilities, but as discussed in Chapter 2, have limited payload capacity, must trade off mine loads for torpedoes, have lengthy transit times, and, perhaps most important, are needed for higher priority missions. Long-range stealthy aircraft, and especially stealthy bombers, with their large payloads, would be attractive options for this mission.



## 7. *Initiative on Enhancing Intelligence Preparation of the Undersea Battlespace:*

The Navy, in conjunction with other government agencies with responsibility for oceanographic and hydrographic research, should put increased emphasis on sustained peacetime intelligence preparation of the undersea battlespace, to include recurrent mapping of undersea arrays as well as offshore energy and telecommunications infrastructure in areas of interest.<sup>133</sup>

## 8. *Initiatives on Increasing Escorts:*

- a. The Navy should examine options for increasing the numbers and combat capability of lower-end warships suitable for SLOC protection and MIO missions.<sup>134</sup>
- b. The Navy should invest in sufficient Maritime Patrol Aircraft (MPA) to support robust SLOC protection and MIO operations as well as their primary ASW and surface surveillance missions in the WPTO.<sup>135</sup>

## 9. *Initiative on Enhancing Counter-Space Capabilities:*

The Air Force should lead a joint assessment of the technical and operational requirements for rapid counter-space operations against PLA space systems.<sup>136</sup>

## Organizational

The following are candidate initiatives with organizational implications for both the Air Force and Navy. Not surprisingly, many of these are closely associated with command and control, communications, and ISR issues, both intra- and

<sup>133</sup> See Joint Publication 2-01.3, *Joint Intelligence Preparation of the Operational Environment*, June 16, 2009 for background on the IPB process. It may be accessed at <http://www.fas.org/irp/doddir/dod/jp2-01-3.pdf>.

<sup>134</sup> The 1970s-era Patrol Frigate (PF) program, which produced the Oliver Hazard Perry-class frigates, was designed to provide a sizable class of low-cost, lower-end ships for convoy escort purposes in the event of a NATO-Warsaw Pact war. The Navy currently intends to buy fifty-five Littoral Combat Ships (LCS), but LCS designs as currently configured appear to lack sufficiently robust ASW or air defense capability to perform escort or SLOC protection duties in the sort of combat environment assumed in ASB. The designs do, however, have an open architecture and appear to have the potential and capacity that can accommodate substantial upgrading of the combat capabilities.

<sup>135</sup> Such aircraft could also be fitted to accommodate other equipment modules, e.g., communications relay systems enabling them to contribute to back-up maritime C2 architectures if required, in addition to their primary tasking.

<sup>136</sup> Classification precludes a more specific discussion of this initiative. The key point here is that the United States must have the capability to deny, promptly and for however long necessary, the PLA's ability to access its space assets.

inter-Service. Importantly, some of these involve issues closely intertwined with deep Service culture norms, and thus could entail changes that could prove especially difficult to implement.

#### *10. Initiatives on Dealing with Degradation of Space-Based C2, Communications and ISR Capabilities and Capacities:*

- a. The Air Force and Navy should rigorously train for and recurrently conduct exercises that simulate operations under conditions of lost or degraded space capabilities and capacities. Such “week without space” exercises, emulating the fleet-wide “Smallpipe” exercises of Cold War days,<sup>137</sup> while no doubt quite painful given today’s high dependence on space systems, are a prerequisite for demonstrating to the PLA and other potential adversaries the ability of US military forces to cope with the loss or degradation of space assets. Such exercises should also test deploying of back-up capabilities to demonstrate C2 and ISR surge capacity. If sufficiently robust, such demonstrations could reduce PLA incentives to strike US space systems.
- b. The Air Force and Navy should develop protocols, techniques and procedures for responding to denied or degraded communications environments. These should allow for graceful, tiered reduction of contemporary huge bandwidth consumption.<sup>138</sup>
- c. The Air Force and Navy should assess the operational viability of future penetrating UAVs that rely on secure C2. Based on the joint assessment, they should develop and field technologies to enable unmanned or optionally manned aerial vehicles to continue to operate at extended-range in degraded C2 environments.

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<sup>137</sup> See p. 60, footnote 90.

<sup>138</sup> It would also be useful, though culturally very difficult, to systematically seek ways to reduce bandwidth demands where these are excessive or unnecessary. The US military’s luxury of essentially having “bandwidth on demand” has tended to inculcate a mindset that does not prize efficient use of bandwidth, resulting in a certain mental laxness. For example, consider the high demand for full-motion video for non-operational purposes. As an analogy, during the Cold War era, Soviet mathematicians often did more elegant work than their western counterparts because the computer technology available to them was far less developed than in the West. Thus they were forced to be highly disciplined and efficient in their algorithms and programming, as opposed to Westerners who could solve many problems through “brute force” computation because it was far easier. The difficulty comes for the Air Force and Navy if the “excess capacity” is suddenly no longer available, as would be the case if the US satellite architecture were degraded or destroyed.

### *11. Initiatives on Future Standardization and Interoperability of Data Links, Data Structures and C2 and ISR Infrastructure:*

- a. The Air Force and Navy should jointly assess the technical and operational requirements for future generation data links, data structures, and associated information infrastructure.
- b. The Air Force and Navy should jointly develop and field fully compatible and interoperable ISR and PED (processing, exploitation, dissemination) architectures.

### *12. Initiatives on Convergence of the Air Operations Center (AOC) and Maritime Operations Center (MOC) Constructs.<sup>139</sup>*

- a. The Air Force and Navy should jointly assess how AOCs and MOCs can achieve adequate connectivity in the near-term to maintain a common operating picture in support of dual-Service operations.
- b. The Air Force and Navy should jointly assess whether and how AOCs and MOCs in the future could be integrated, in whole or in part, to support dual-Service and multi-Service operations.
- c. The Air Force and Navy should jointly assess whether and how AOC functions could be carried out from Navy ships if required.

### *13. Initiative on Dual-Service Operations Specialization:*

The Air Force and Navy should establish a dual-Service professional career specialization and train a cadre of officers focused on serving on staffs and eventually as commanders of joint aerospace-maritime task forces. These officers would serve multiple tours in both Services, acquire a thorough understanding of both Air Force and Navy forces and missions as well as integrated aerospace-maritime operations, and would normally be assigned to such operational task forces, AOCs/MOCs and associated training assignments for most of their careers.<sup>140</sup>

<sup>139</sup> An AOC is a command center construct long used by the Air Force to manage theater air operations. For more detailed information on AOCs, see, for example, <http://www.fas.org/man/dod-101/usaf/docs/aoc12af/parto2.htm>. The Navy has more recently adopted an analogous approach by establishing MOCs. See “Maritime Operations Center Offers State of the Art Capability for U.S. Fleet Forces” at [http://www.navy.mil/search/display.asp?story\\_id=49154](http://www.navy.mil/search/display.asp?story_id=49154).

<sup>140</sup> This initiative would create a different category of officer specialization and career path that could be considered somewhat analogous, though at a lower level, to that of militaries that had a General Staff in addition to the Service-specific officer corps. General Staff officers (who were generally admitted through competitive professional examination) served alternately in General Staff assignments and in line assignments in their home Services.

## Technological/Materiel

The following are proposed initiatives concerning mainly technological or materiel matters.

### *14. Initiatives on Electronic Warfare:*

- a. The Air Force and Navy should significantly increase emphasis on and investment in cross-Service EW capability and capacity, including coordination on investments in low observables and long-range penetrating and stand-off EA-capable platforms (manned and/or unmanned).
- b. The Air Force and Navy should develop and field in quantity obscurants,<sup>141</sup> decoys, and false target generators for both offensive and defensive missions, and make it clear that they are widely deployed and effective.
- c. The Air Force and Navy should increase the emphasis on realistic electronic warfare training in major exercises.<sup>142</sup>

### *15. Initiatives on High-Capacity Airborne C3 Relay Networks:*

- a. The Air Force should lead a joint Air Force-Navy assessment of the operational requirements, technical characteristics, and required components of wide-area airborne networks that could back up or replace lost functionality or capacity in C3-degraded environments.<sup>143</sup>
- b. Based on that assessment, the Air Force and Navy should jointly develop and field the components of such networks, and jointly develop the protocols and tactics required to deploy them rapidly when required.
- c. The Air Force and Navy should routinely conduct training exercises involving deploying and operating these networks, to include short-notice drills as well as incorporating “week without space” drills into larger exercises.

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<sup>141</sup> Obscurants, properly deployed for ship defense against missiles, are particularly highly effective across a large part of the electro-magnetic spectrum and are generally inexpensive as well. It may be that the low cost of obscurant initiatives has contributed to the lack of interest within the Services’ senior leadership.

<sup>142</sup> Electronic warfare has traditionally been neglected in US military training, in part because it has been a somewhat esoteric and poorly understood professional specialty, much in the same way that mine warfare has been a neglected specialization in “mainstream” Navy. Consequently, EW is rarely rigorously practiced in large-scale exercises.

<sup>143</sup> Both the Air Force and Navy have been working on such concepts for a considerable period. See, for example, [http://www.mitre.org/news/events/xml4bin/pdf/stranc\\_airborne.pdf](http://www.mitre.org/news/events/xml4bin/pdf/stranc_airborne.pdf). Key components could include systems like aerostats and UAVs. It will be important for both budgetary and operational reasons that such efforts are well-coordinated and result in fully interoperable capabilities for both Services.

### *16. Initiative on Reducing Reliance on GPS:*

The Air Force and Navy should jointly continue developing and fielding capabilities that provide complementary or back up functionality in the event of loss or severe GPS system degradation in precision navigation and timing, and guidance of precision guided weapons.

### *17. Initiatives on Directed-Energy Weapons (DEW) Systems:*

- a. The Air Force and Navy should increase research and development in DEW systems for land- and sea-based point defense against missiles.
- b. If and when DEW systems become cost-effective, the Air Force and Navy should field them.

### *18. Initiatives on Extended-Range Unmanned Undersea Vehicles (UUV):*

- a. The Navy should continue to develop and field long-range/endurance UUVs for multiple missions germane to intelligence preparation of the undersea battlespace, including deploying leave-behind surveillance sensor arrays; near-land and harbor-monitoring missions; oceanographic research support; monitoring undersea infrastructure; and ASW tracking.<sup>144</sup>
- b. The Navy should develop and field in significant numbers smart mobile mines capable of autonomous movement to programmed locations over extended distances.<sup>145</sup> Such mines should be deployable by submarines and stealthy Air Force bombers.

### *19. Initiatives on Increasing Warship Ordnance Payloads:*

- a. The Navy should continue its efforts to develop and field the capability to rearm surface ship VLS cells at sea.<sup>146</sup>

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<sup>144</sup> See *The U.S. Navy Unmanned Undersea Vehicle (UUV) Master Plan*, November 9, 2004, accessed at [www.navy.mil/navydata/technology/uuvmp.pdf](http://www.navy.mil/navydata/technology/uuvmp.pdf) and Bettina Chavane, "RAND Study Distills U.S. Navy UUV Missions," *Aviation Week & Space Technology*, July 9, 2009. The Navy will also need to assess the right "mix" of manned and unmanned systems, as well as operational concepts to maximize their synergy.

<sup>145</sup> Such mines are, in effect, UUVs.

<sup>146</sup> The requirement to rearm surface ship VLS cells at sea is not new. Various Navy organizations such as the Office of Naval Research (ONR) and the Naval Surface Warfare Center at Port Hueneme continue to explore various means of doing so. See, for example, <http://www.msc.navy.mil/sealift/2006/February/visit.htm>. However, the prospect of high missile expenditure rates for missions such as sea-based missile defense during major conflicts should provide additional impetus to efforts to field such a capability as soon as it becomes practicable.

- b. The Navy should plan to replace the Ohio-class SSGNs upon the end of their expected service lives (late 2020s) with a follow-on SSGN class with similar or greater payload capacity.<sup>147</sup>
- c. The Navy should require future flights of Virginia-class SSNs to incorporate Multi-Mission Payload Modules.
- d. The Navy should continue to assess the technical requirements for, and operational implications of, developing and fielding new kinds of submarine payload modules of various kinds to increase undersea strike capacity.
- e. The Navy should require future submarine designs to incorporate an at-sea rearming capability.

## *20. Initiatives on Increasing Global Precision-Guided Munitions Inventories*

- a. The Air Force and Navy should assess on a continuing basis projected munitions demands based on evolving future security environment trends and realistic PGM expenditure rates.
- b. Based on such assessment(s), the Air Force and Navy should stockpile these munitions in sufficient quantities to execute an AirSea Battle campaign and/or maintain adequate PGM surge production capacity for accommodating unexpectedly high expenditure rates (see Other Issues below).

## *21. Initiative on Sustaining Adequate Aerial Refueling Capacity*

The Air Force should invest in sufficient air tanker force structure to meet the likely combined Air Force and Navy refueling demands during large-scale sustained combat operations, taking into account the great WPTO distances and the likelihood that forward bases would be unavailable for use for extended periods.<sup>148</sup>

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<sup>147</sup> Design and procurement of follow-on SSGNs could be accomplished as part of, or in conjunction with, the SSBN(X) program, which, if enacted as expected, will replace current-generation ballistic missile submarines.

<sup>148</sup> As with Navy MPA, aerial tankers could also be fitted to accommodate other equipment modules. (e.g., communications relay systems) to enable them to contribute to back-up maritime C2 architectures if required.

## Other Issues

Several other issues bear directly on an AirSea Battle concept, but are not solely within the purview of the Air Force or the Navy. Rather, they either involve the Department of Defense as a whole or require policy decisions from outside the Department.

### *Japanese support*

Given the importance of Japan in US strategy in the WPTO, there are a number of measures Japan can take to support allied AirSea Battle operations. Conversely, there are actions the United States can take to help the Japanese buttress their capabilities.

Efforts should be undertaken with Japan to:

- > Harden selected bases, increase rapid runway repair capacities, and locate critical military assets and sites (e.g., key headquarters and operations sites) deep underground or within mountains (Japan's topography is particularly suited for this);
- > Fully integrate its ground- and sea-based integrated air and missile defense systems and operations (including intelligence and early warning cooperation) with US forces stationed in and near Japan;
- > Increase Japan's air and ballistic missile defenses;
- > Expand its inventory of fourth-generation fighters and procure fifth-generation, air superiority fighters to protect its airspace and free up US fighters for offensive missions;
- > Expand its undersea warfare and ASW capabilities, including its submarine fleet and UUVs; and
- > Prepare plans in cooperation with the US Navy for establishing ASW barriers that take advantage of the geography of the Ryukyus island chain.

The United States should:

- > Offer Japan the opportunity to procure US DEW systems if such systems prove operationally effective and cost-effective;<sup>149</sup> and
- > Offer Japan the opportunity to procure fifth-generation fighters.

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<sup>149</sup> There may be a potential security issue here. If DEW technology ultimately proves highly effective, US leaders may be reluctant to share it with allies, as was the case with congressional refusal to allow F-22 export sales. There is also the further question of how proliferation of the technology to potential adversaries would affect future US military operations.

### *Australian Support*

Efforts should be undertaken with Australia to:

- > Partner with the United States and Japan in developing the next-generation anti-ship/anti-surface cruise missile;
- > Support its fielding a fifth-generation fighter force to support combined air superiority and ASW operations;
- > Join the US space surveillance system and build an S-Band radar to improve southern hemisphere SSA; and
- > Establish an offshore node for the US Joint Space Operations Center to create a Combined Space Operations Center, thereby improving operational integration and enhancing C2 survivability.

### *Cyber war and security of logistics networks*

DoD, the Services, and possibly other US government entities should determine whether the unclassified networks that support US military operational logistics can be reliably defended against cyber attacks. If they cannot, DoD should consider going to closed networks for operational logistics information and data flows. DoD interfaces with commercial suppliers may require specialized gateways, perhaps analogous to the mechanisms that currently permit controlled interfaces between US and certain allied networks. Similarly, DoD should consider introducing additional safeguards and protocols into information systems to verify identities and the reliability of transmitted information.

### *Defense Industrial Base and Surge Production of Precision-Guided Weapons*

As previously noted, expenditure rates of precision-guided munitions during previous conflicts have been extraordinarily (and always unexpectedly) high. PGM expenditures in a Sino-US conflict of the type described in this paper would almost surely be similarly high. Given the size of the PRC and its military forces, the global inventories of such weapons, both offensive and defensive, on both sides would likely approach exhaustion at a relatively early stage of the conflict. This could produce a prolonged period of mutual limited activity while both sides regenerate their inventories of key assets and weapons.

Thus the relative responsiveness of each side's defense industrial base regarding its most critical systems could be a key factor in determining which side would most rapidly regain the initiative, and ultimately prevail in a prolonged conflict. This is a factor arguing for striking selected sites (e.g., ballistic missile production facilities) within China. However, to exploit success in preventing or delaying



PLA efforts to restore its A2/AD system capacities, the US defense industrial base must be able to replenish US inventories of PGMs rapidly. Joint DoD-industry contingency plans should reflect this national security requirement.<sup>150</sup>

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<sup>150</sup> The Defense Production Act (Public Law 81-774) was enacted in 1950, and remains in force as amended today. It was part of a broad civil defense and war mobilization effort in the context of the Cold War. It should be updated to reflect a requirement for surge capacity of precision guided weapons.

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## CHAPTER 5 > **A POINT-OF-DEPARTURE CONCEPT**

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This paper has argued that implementing the AirSea Battle concept described would greatly enhance US and allied aerospace and maritime forces' operational effectiveness in the WPTO.

### **THE CORE OF AIRSEA BATTLE**

The most important question proponents of AirSea Battle must answer is whether the concept would help to restore and sustain a stable military balance in the Western Pacific. The AirSea Battle concept presented here argues that US and allied military forces can withstand initial large-scale Chinese conventional attacks, mitigate their effects, reduce the effectiveness of China's A2/AD system by rapidly blinding it, regain the strategic and operational initiative, and thereby set the stage for sustained follow-on operations. Success here will enhance the US military's ability to preserve a vital national security interest and meet US treaty and legal obligations to allies and partners in the region.

AirSea Battle is oriented on offsetting the central elements of the evolving Chinese A2/AD operational approach. To counter such an approach, AirSea Battle focuses on precluding China from achieving a quick victory in a war, or from believing it can coerce US allies and partners.

### **What Each Service Provides the Other**

The AirSea Battle concept finds each Service supporting the other in achieving essential missions. Some important instances of mutual support include:

- > Air Force counter-space operations to blind PLA space-based ocean surveillance systems, thereby preventing the PLA from targeting high-value Navy surface units, including carriers, thereby enabling Navy operational freedom of maneuver in the maritime domain; Navy platforms could aid counter-space operations in support of the Air Force space control missions if required;<sup>151</sup>
- > Navy AEGIS ships supplementing other missile-defense assets in defense of Air Force forward bases and Japan;
- > Air Force long-range penetrating strike operations to destroy PLA ground-based long-range maritime surveillance systems and long-range ballistic missile launchers (both anti-ship and land-attack) to expand the Navy's freedom of maneuver and reduce strikes on US and allied bases and facilities; Navy submarine-based ISR and strike support against PLA IADS systems to degrade them and thereby enable Air Force strikes;
- > Navy carrier-based fighters' progressive rollback of PLA manned and unmanned airborne ISR platforms and fighters to enable the forward operation of Air Force tankers and other support aircraft; and
- > Air Force support of the ASW campaign through offensive mining by stealthy bombers and persistent non-stealthy bomber strike support of Navy ships conducting distant blockade operations.

## HOW URGENT IS AIRSEA BATTLE IMPLEMENTATION?

The preceding discussion suggests the United States and its allies in the WPTO should begin now to develop an AirSea Battle concept and the ability to execute it. The continuing increases in China's "comprehensive national power," especially its military component are of growing concern to regional governments. Adding to this unease is the concomitant perception by many that the United States is overly focused on irregular warfare and ongoing conflicts in the Central Command AOR at the cost of regional security interests in the Western Pacific. Regional actors and security partners such as Australia are already reacting to their perceptions of a growing regional imbalance by planning major military spending increases of their own.<sup>152</sup> Some of them also increasingly question future US commitment to the region.

<sup>151</sup> The February 2008 shoot-down of a crippled US military satellite by USS *Lake Erie* with an SM-3 missile illustrates the potential of AEGIS ships to be employed in this manner. Navy units could also use non-kinetic means (e.g., jamming, dazzling) to support Air Force counter-space operations.

<sup>152</sup> See, for example, "Defending Australia in the Asia-Pacific Century: Force 2030," *Defence White Paper 2009*, accessed at [www.defence.gov.au](http://www.defence.gov.au), and Kathrin Hille and Tim Johnston, "SE Asia Arms Purchases Fuel Fear of Clashes," *Financial Times (Asia)*, March 15, 2010, p.3.

Given this, two AirSea Battle matters appear particularly urgent. First, it would be useful for the Department of Defense to place continuing serious emphasis on developing the AirSea Battle concept in detail as a signal of US commitment to security in the Western Pacific and to reassure regional partners in the near-term. This commitment should be recurrently demonstrated through frequent public statements by senior civilian and military leaders.

Secondly, migration of the Air Force and Navy to fully compatible and interoperable, if not common, C2, ISR and PED architectures is at once the most critical and most complex challenge, and would have the longest lead time of any of the initiatives to implement from an overall systemic perspective. As such, the pacing of its implementation would be, in a sense, that of AirSea Battle as a whole. This suggests that implementing AirSea Battle will be an evolutionary phenomenon, playing out over the better part of a decade, and perhaps even longer.<sup>153</sup> However, given the momentum behind the PLA's military developments, this only reinforces the need for urgency. If further incentive is needed, it can be found in the declining US and allied economic strength relative to China; this relative decline seems likely to persist at least over the near-term future. Moreover, the rapid growth projected for entitlement spending in the United States and Japan will almost certainly create downward pressure on both countries' defense budgets. Simply put, neither country can afford a "rich" or "lazy" man's approach to its defense program: both must pursue a "smart man's" strategy.

Finally, it makes sense to field an AirSea Battle capability for reasons that are independent of the WPTO. The ability of the Air Force and Navy to execute highly integrated operations would be useful across a range of future scenarios, while the long-term cost efficiencies from doing so would appear highly desirable purely from a budgetary perspective. However, while such reasons might be *sufficient* to undertake the implementation of AirSea Battle, it is the growing military imbalance in the Western Pacific that makes it *necessary* to do so.

## A FINAL NOTE

This paper offers a point-of-departure AirSea Battle concept. While the authors are confident that many of the ideas and initiatives presented will be incorporated into a final version of AirSea Battle, some may not withstand more detailed scrutiny, or require significant modification. All elements of an eventual AirSea Battle concept — irrespective of their origin — will require real-world experimentation and testing before being adopted.

What is needed most at this point, however, is to begin a serious, persistent effort to address the growing military imbalance in an area of vital interest to

Migration of the Air Force and Navy to fully compatible and interoperable, if not common, C2, ISR and PED architectures is the most critical and most complex challenge—the pacing of its implementation would be that of AirSea Battle as a whole.

<sup>153</sup> See Tab B for a discussion of some of the challenges that implementation of AirSea Battle could face.

the United States, the Western Pacific. It is in this spirit that we are providing an initial AirSea Battle concept. Our hope is to make a modest contribution to those in the Air Force and Navy who have taken on this critical challenge.

## GLOSSARY

<b>3GIRS</b>	Third-Generation Infrared System
<b>A2/AD</b>	Anti-access/area-denial
<b>AAM</b>	Air-to-air missile
<b>AEA</b>	Airborne electronic attack
<b>AIP</b>	Air-independent propulsion
<b>ALCM</b>	Air-launched cruise missile
<b>ALHK</b>	Air-Launched Hit-to-Kill
<b>AMRAAM</b>	Advanced medium-range air-to-air missile
<b>AOC</b>	Air Operations Center
<b>ASAT</b>	Anti-satellite [capabilities]
<b>ASBM</b>	Anti-ship ballistic missile
<b>ASCM</b>	Anti-ship cruise missile
<b>ASUW</b>	Anti-surface warfare
<b>ASW</b>	Anti-submarine warfare
<b>AUV</b>	Autonomous Undersea Vehicle
<b>BACN</b>	Battlefield Airborne Communications Nodes
<b>BDA</b>	Battle damage assessment
<b>BMD</b>	Ballistic missile defense
<b>C2</b>	Command and control
<b>C4</b>	Command, control, communications, and computers
<b>CLF</b>	Combat logistics force
<b>CSG</b>	Carrier strike group
<b>DEW</b>	Directed energy weapon
<b>DOTMLPF</b>	Doctrine, organizational, training, materiel, leadership, personnel and facilities
<b>EA</b>	Electronic attack
<b>EM</b>	Electromagnetic

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<b>EP</b>	Electronic protection
<b>ES</b>	Electronic support
<b>EW</b>	Electronic warfare
<b>FEBA</b>	Forward edge of the battle area
<b>FOFA</b>	Follow-on forces attack
<b>GEO</b>	Geosynchronous earth orbit
<b>HALE</b>	High-altitude, long-endurance
<b>IADS</b>	Integrated air defense system
<b>INF</b>	Intermediate-Range Nuclear Forces
<b>IRBM</b>	Intermediate-range ballistic missile
<b>ISR</b>	Intelligence, surveillance, and reconnaissance
<b>JDAM</b>	Joint direct attack munition
<b>JASSM</b>	Joint air-to-surface standoff missile
<b>JSDF</b>	Japanese Self-Defense Force
<b>JASDF</b>	Japanese Air Self-Defense Force
<b>LACM</b>	Land-attack cruise missile
<b>LCS</b>	Littoral Combat Ship
<b>LEO</b>	Low Earth Orbit
<b>LOS</b>	Line-of-sight
<b>LRPS</b>	Long-range precision strike
<b>MaRV</b>	Maneuverable reentry vehicle
<b>MIO</b>	Maritime interception operations
<b>MPA</b>	Maritime patrol craft
<b>MOC</b>	Maritime Operations Center
<b>MRBM</b>	Medium-range ballistic missile
<b>NCADE</b>	Network Centric Airborne Defense Element
<b>ONA</b>	Office of Net Assessment
<b>ORS</b>	Operationally responsive space

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<b>OSD</b>	Office of the Secretary of Defense
<b>OTH</b>	Over-the-horizon
<b>PED</b>	Processing, exploitation, and dissemination
<b>PGM</b>	Precision-guided munition
<b>PLA</b>	People's Liberation Army
<b>PLAAF</b>	PLA Air Force
<b>PLAN</b>	PLA Navy
<b>POL</b>	Petrol, oil and lubricants
<b>PRC</b>	People's Republic of China
<b>SAM</b>	Surface-to-air missile
<b>SBIRS</b>	Space-Based Infrared System
<b>SEAD</b>	Suppression of enemy air defenses
<b>SLOC</b>	Sea lanes of communication
<b>SRBM</b>	Short-range ballistic missile
<b>SSA</b>	Space situational awareness
<b>SSBN</b>	Ballistic missile submarine
<b>SSGN</b>	Cruise missile submarine
<b>SSN</b>	Attack submarine
<b>TEL</b>	Transporter Erector Launcher
<b>TLAM</b>	Tomahawk land-attack missile
<b>TPFDD</b>	Time-Phased Force and Deployment Data
<b>UAV</b>	Unmanned aerial vehicle
<b>UCAS</b>	Unmanned Combat Air System
<b>UUV</b>	Unmanned undersea vehicle
<b>VLS</b>	Vertical launching system
<b>WPTO</b>	Western Pacific Theater of Operations





## TAB A > **MEMORANDUM OF AGREEMENT ON U.S. ARMY-U.S. AIR FORCE JOINT DEVELOPMENT PROCESS**

*Department of the Army Historical Summary: FY 1984*

### **Appendix A**

Department of the Army  
Headquarters, U.S. Army  
Washington, D.C.

Department of the Air Force  
Headquarters, U.S. Air Force  
Washington, D.C.

22 May 1984

### **MEMORANDUM OF AGREEMENT ON U.S. ARMY- U.S. AIR FORCE JOINT FORCE DEVELOPMENT PROCESS**

1. The Army and the Air Force affirm that to fulfill their roles in meeting the national security objectives of deterrence and defense, they must organize, train, and equip a compatible, complementary and affordable Total Force that will maximize our joint combat capability to execute airland combat operations. To that end, broad, across-the-board, war-fighting issues have been addressed. We believe the resulting agreements listed in the attachment will significantly enhance the country's military posture and have a major positive impact on the way future combat operations are conducted.

2. The Army and the Air Force view this MOA as the initial step in the establishment of along-term, dynamic process whose objective will continue to be the fielding of the most affordable and effective airland combat forces. Consequently, the joint agreements embodied in the attached initiatives will be updated and reviewed by the services annually to confirm their continued advisability, feasibility, and adequacy. We will expand this MOA (and attachments) to include future joint initiatives, as appropriate.

3. As an integral part of the joint effort to ensure the development of the optimum airland combat capability, the services will annually exchange a formal priority list of those sister service programs essential to the support of their conduct of successful airland combat operations, the purpose of which is to ensure the development of complementary systems without duplication. The services will resolve joint or complementary system differences prior to program development. The services will ensure that those programs supporting joint airland combat operations will receive high priority in their respective development and acquisition processes. The MOA confirms our mutual dedication to ensuring that the provision of the best combat capability to the Unified and Specified Commanders remains the top priority of the Army and the Air Force.

JOHN A. WICKHAM, JR.  
General, United States Army  
Chief of Staff

CHARLES A. GABRIEL  
General, United States Air Force  
Chief of Staff

1 Atch  
Initiatives for Action

## CSA/CSAF INITIATIVES FOR ACTION

1. Initiatives on Area Surface-to-Air Missiles/Air Defense Fighters:
  - a. The Air Force will participate in the requirement and development process for follow-on area surface-to-air missile (SAM) systems.
  - b. The Air Force will lead a joint net sensitivity analysis to determine the optimum program mix of current area SAMs and air defense fighters.
  - c. The Army will lead a joint effort to study the advisability and feasibility of transferring proponentcy for area SAMs from the Army to the Air Force.

2. Initiatives on Point Air Defense:
  - a. The Army and Air Force will jointly develop a plan to resolve air base point air defense (PAD) requirements.
    - (1) The Air Force will provide to the Army an updated list of outstanding worldwide PAD requirements.
    - (2) This joint plan will be reviewed annually.
  - b. The Army and Air Force will develop a joint statement of need for fixture rear-area PAD systems.
  - c. The Air Force will participate in the on-going Army effort to review air defense requirements and capability at Corps and Echelons above Corps.
3. Initiatives to Counter Heliborne Assault Threat:
  - a. The Army will lead a joint assessment of the technical characteristics and operational implications of the future heliborne assault threat.
  - b. Based on the joint assessment the Army and Air Force will jointly develop and field the capabilities to detect and counter the threat.
4. Initiatives on the Tactical Missile Threat:
  - a. The Army and Air Force will complete the tactical missile threat assessment, to include evaluation of the operational impact of anticipated threat technical capabilities.
  - b. Using this threat assessment as the baseline, the Army and Air Force will establish a joint Anti-Tactical Missile Program.
5. Initiatives on Identification Friend or Foe (IFF) Systems:
  - a. The Army and Air Force will continue joint research in cooperative friendly identification systems to identify cost-effective refinements for the Mark XV Question and Answer (Q,&A) identification program.
  - b. The Army and Air Force will develop an IFF system (to include noncooperative, positive hostile identification) that will enable the effective employment of beyond visual range weapons against hostile aircraft.
6. Initiatives on Rear Area Operations Centers (RAOCs):
  - a. The Army will increase full-time manning of RAOCs as part of the on-going Army Reserve/Army National Guard program to expand manning by full-time support personnel.

- b. The Army will establish the appropriate number of ARNG long tour (OCONUS) positions in each RAOC unit.
- 7. Initiative on Host Nation Support Security Equipment. The Army and Air Force support equipment of FRG reserve security units with German equipment and weapons; with US to FRG equipment ratios to be determined in conjunction with overseas commanders.
- 8. Initiatives on Air Base Ground Defense:
  - a. The Army and Air Force will develop a joint Service Agreement for:
    - (1) Army units to provide air base ground defense (ABGD) outside the base perimeter.
    - (2) Operational control of Army units performing the ABGD mission by the appropriate air component commander.
  - b. The Air Force will transfer Air Force Reserve Component manpower spaces to the Army, if the Air Force ABGD requirements exceed Army capabilities.
  - c. The Army and Air Force will develop joint procedures for rear area security reflecting these initiatives.
- 9. Initiative for ABGD Flight Training. The Army and Air Force will execute a joint Service Agreement for the Army to provide initial and follow-on training for Air Force on-site security flights.
- 10. Initiative for Rear Area Close Air Support. The Army and Air Force will develop joint doctrine and procedures for the employment of Close Air Support (CAS) in the rear area.
- 11. Initiative on the Mobile Weapon System. The Air Force will terminate development of the Mobile Weapon System.
- 12. Initiatives on Ground-based Electronic Combat against Enemy Air Attacks:
  - a. The Army and Air Force will reconcile their joint requirements and restructure the Air Defense Electronic Warfare System (ADEWS) programs accordingly.
  - b. The Air Force will terminate the Comfy Challenge program.
  - c. The Army will develop ADEWS to incorporate the required capabilities for both services.

13. Initiative on the Airborne Radar jamming System (ARJS). The Army will terminate the ARJS program. The Air Force will provide airborne jamming support.
14. Initiative on the Precision Location Strike System (PLSS). The Army and Air Force will develop a joint concept and attendant hardware to broadcast PLSS target information to designated Army units in near-real-time.
15. Initiatives on joint Suppression of Enemy Air Defenses (J-SEAD)
  - a. The Army's analytical agencies will model J-SEAR to determine the overall contribution of an effective SEAD campaign and the impact of SEAD on ammunition expenditure rates. The Air Force will provide full time participation.
  - b. Army Field Manuals will be updated to address transmittal of PLSS targeting information direct to designated Army units.
16. Initiatives on Combat Search and Rescue:
  - a. The Air Force will remain proponent for Air Force Search and Rescue (SAR) with Special Operations Forces (SOF) providing a back-up capability in special situations.
  - b. The Air Force will:
    - (1) Determine Air Force combat SAR objectives in relation to depths on the battlefield defined by capability.
    - (2) Develop tactics, techniques, and procedures for conduct of SAR in Air Force zones.
  - c. The Army and Air Force will develop tactics, techniques, and procedures for SOF to conduct SAR beyond Air Force zones.
17. Rotary Wing Lift Support for Special Operations Forces (SOF). The Air Force will transfer the responsibility for providing rotary wing lift support for SOF to the Army. A detailed implementation plan will be jointly developed.
18. Initiatives on the joint Tactical Missile System (JTACMS):
  - a. The Army and Air Force will develop a joint statement of need for the JTACMS. The restructured program will include the joint development of procedures to ensure that respective service components of JTACMS are fully complementary.

- b. The Army will refocus its current development efforts on a shorter range ground-launched system.
  - c. The Air Force will develop an air-launched system.
- 19. Initiative on Army and Air Force Munitions RDT&E. The Army and Air Force will develop procedures for a joint and recurring review of munitions technical base programs keyed to the budget/POM cycle. This review will use the joint Logistics Commanders structure and include Army and Air Staff participation.
- 20. Initiatives on Night Combat:
  - a. The Army and Air Force will jointly determine the requirements for night operations.
  - b. The Air Force will pursue a spectrum of night capabilities based on the joint requirements and resolve associated training issues.
  - c. The Air Force will designate a single Air Staff point of contact for night systems and establish an Air Force liaison to the Army Night Vision and Electro-Optics Laboratory.
- 21. Initiatives on Battlefield Air Interdiction:
  - a. The Army and Air Force will develop procedures that can be tailored to theater specific requirements, to synchronize Battlefield Air Interdiction (BAI) with maneuver.
  - b. The Army and Air Force will field test these procedures.
  - c. The Army will automate the Battlefield Coordination Element (BCE) and connect BCE/Corps/Land Component Commanders via near-real-time data links.
- 22. Initiative on a joint Target Set. The Army and Air Force will conduct a joint target assessment for use in establishing a consensus on attack of enemy surface targets and development of coordinated munitions acquisition plans.
- 23. Initiatives on Theater Interdiction Systems:
  - a. In theater, the Air Component Commander is responsible for the execution of the interdiction campaign.
  - b. The Air Force will lead a joint study to:
    - (1) Establish procedures to jointly develop requirements for interdiction systems.

- (2) Define future conventional interdiction requirements.
  - (3) Determine optimum service proponderencies for Intermediate Nuclear Force (INF) systems.
24. Initiative on Close Air Support (CAS). The Army and Air Force reaffirm the Air Force mission of providing fixed-wing CAS to the Army.
25. Initiatives on Air Liaison Officers and Forward Air Controllers:
- a. The Army and the Air Force will provide enhanced training in maneuver unit operations for Air Liaison Officers (ALOs) and selected Forward Air Controllers (FACs).
  - b. The Army and Air Force will conduct an in-depth review and evaluation of FAC operations and Tactical Air Control Party (TACP) structure to include:
    - (1) Enhancing maneuver unit ground FAC capability with organic Army helicopter support.
    - (2) Executing ground FAC functions while operating from organic maneuver unit vehicles.
    - (3) Performance of battalion FAC duties by non-rated officers in order to expand the full time Air Force representation at the maneuver battalion.
  - c. The review and evaluation will be conducted in the following phases:
    - (1) Phase I: An internal review conducted by Tactical Air Command (TAC).
    - (2) Phase II: A joint TAC and Training and Doctrine Command (TRADOC) review, to include development of a joint field test plan of the proposed FAC/TACP concepts.
    - (3) Phase III. Joint field test.
26. Initiatives on Manned Aircraft Systems:
- a. The Army and Air Force will establish specific service responsibilities for manned aircraft systems.
  - b. The Army and Air Force will establish procedures for developing coordinated joint positions on new aircraft starts prior to program initiation.
27. Initiatives on Joint Surveillance and Target Attack Radar System (JSTARS)
- a. The Army and Air Force will support the G18 as the single JSTARS platform.



- b. The Army and Air Force will develop a joint Memorandum of Agreement to:
    - (1) Outline procedures to ensure dedicated support of ground commander requirements.
    - (2) Ensure adequate platform procurement to provide required support.
- 28. Initiatives on TR-1 Program. The Air Force and Army will restructure the current TR-1 program to enhance its wartime survivability and effectiveness, within the bounds of affordability.
- 29. Initiatives for Manned Tactical Reconnaissance Systems:
  - a. The Army and Air Force will jointly develop requirements for common platforms to meet follow-on manned Special Electronic Mission Aircraft (SEMA) and Tactical Reconnaissance needs.
  - b. When joint requirements can best be met by a single service platform (Army or Air Force), that service will assume single service mission and development proponentcy. In parallel with this, procedures will be jointly developed and adequate platforms procured by the responsible service, to ensure dedicated support of the other service's requirements.
- 30. Initiatives on Intratheater Airlift:
  - a. The Army and Air Force will establish a joint office to determine intra-theater airlift requirements to support movement from Aerial Port of Debarkation/Sea Port of Debarkation to destination; resupply by airland/airdrop; reposition/redeployment of forces, equipment, munitions, and war reserve; and medical/noncombatant evacuation.
  - b. The Army and the Air Force will develop joint positions, as required, on intratheater airlift programs.
- 31. Initiative on POM Priority List. The Army and Air Force will formalize cross-service participation in the POM development process. This formalization will include the annual exchange of a formal priority list of those sister service programs essential to the joint conduct of airland combat operations.

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## TAB B > **IMPLEMENTING AN AIRSEA BATTLE CONCEPT**

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The candidate initiatives advanced in this paper are easy to state; realizing them is considerably harder. Even under ideal conditions, implementing an AirSea Battle concept like the one presented here would be difficult, especially in the current fiscal environment, the glacial pace of Defense acquisition, and long-standing inter-Service (and, in this case, intra-Service) rivalries. Even under the best conditions, acquiring the necessary capabilities and conducting the training required to execute the concept and training could take the better part of a decade, or longer.

### **SOME IMPLEMENTATION CHALLENGES**

Major issues that must be dealt with to implement an ASB concept successfully include:

- > The great complexity of implementing key enablers;
- > Substantial technology R&D and acquisition timelines for many component pieces;
- > Growing downward pressures on defense resources;
- > Feasible migration paths from current to future forces and capabilities; and
- > Service buy-in, including acceptance of significant changes that impact Service cultures.

### **The Complexity of Implementing Key Enablers**

Part of the complexity involves maturing cutting-edge technologies needed for specific programs or capabilities, e.g., weapons, sensors, IT systems, or platforms

of various kinds. However there is nothing new there: acquiring new capabilities, platforms or systems has always entailed solving technical and other problems. What really makes the implementation ASB especially thorny is that the concept is fundamentally based on creating a very high level of connectivity and interoperability among a wide range of physical systems, human operators, and organizations. Nevertheless, the effort to create a force capable of executing AirSea Battle must be made, unless the United States is willing to cede control of an area it has long considered to be of vital interest to its security, and to abandon its commitments to long-standing allies in the process.

There are two kinds of interoperability involved so that entities can operate seamlessly: technical interoperability of hardware and software; and procedural interoperability. Achieving both kinds will inevitably be toughest with respect to C2, communications, and ISR, simply because these drive the information and data flows that are intrinsically interwoven in virtually all physical systems and underpin all military operations.

### *Technical Interoperability*

Battle networks supporting the command and control, communications and ISR connectivity essential for conducting US military operations are central to optimal execution of the ASB concept. Protecting and exploiting them and concurrently destroying or degrading those of the enemy in the “scouting battle” or “blinding campaign” is the key sub-campaign that enables all the others.

But quite apart from the postulated wartime competition between adversarial battle networks, development and sustainment of such networks in a comprehensive and coherent way across the Air Force and Navy, and ultimately the other two Services as well, represents an extraordinarily complex technical task in its own right.<sup>154</sup>

Over many years, the Air Force and Navy both have developed many Service-specific networks with different technical specifications and standards for particular purposes. As a result, many intra-Service networks are incompatible. The cross-Service problem is worse, in part because historically the Services have developed their own customized networks for their own specific purposes, often within their own internal organizational stovepipes. Issues of security classification further compound the challenge of establishing battle network connectivity between US and allied military forces.

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<sup>154</sup> The arguments in this section largely concern the Air Force and Navy, since these are the two Services whose integrated operations in the Western Pacific theater lie at the core of an AirSea Battle concept. However, they may also be applicable in many cases to the Army and the Marine Corps as well.

The Services, as well as the Department of Defense writ large, are well aware of these challenges.<sup>155</sup> Each Service has been working for years to reduce the number and type of networks it uses. Various Office of the Secretary of Defense and Joint Staff organizations are striving to establish coherent technical standards to facilitate joint operations, albeit with mixed success to date. This will remain a fiendishly difficult problem for many reasons, including the need for diverse interested entities (i.e., designers, users, producers) to agree on various detailed technical standards, the high sunk costs for past investments that Services would be loathe to discard prematurely, and the requirement that legacy systems remain available and employable until the transition to new ones is completed.

### *Procedural Interoperability*

Procedural interoperability is often at least as difficult to achieve as the technical kind. The Services historically have developed their procedures independently for their own traditional missions and tasks. There are a limited number of common procedures for particular purposes, e.g., for coordinated Air Force and Navy strike, air defense, and aerial refueling missions, facilitated by use of common data links such as Link 16. On occasion, ad-hoc arrangements have enabled short-notice inter-Service operations, (e.g., Navy AEGIS ships cooperating with Army PAC-3 missile units during Operation Iraqi Freedom).

Separate Service procedures made sense when the Services tended to conduct most of their operations independently, since Services tended to develop their procedures to optimize the way they operated. These procedures also reflected and were influenced by each Service's internal culture.<sup>156</sup> However, the AirSea Battle concept envisions significantly more frequent and closer interaction, indeed integration, among Air Force and Navy assets for many missions and tasks. This integration would be most critical (and complex) with regard to the seamless flow of C2, communications and ISR information and data among both Services' platforms. Ideally, the sensor(s) best situated to obtain information or data (e.g., regarding a particular strike target or incoming threat) would provide it to the weapons system optimally placed to act, regardless of Service ownership. However, the way such systems are employed could be very Service tactics- and procedures-dependent. For example, whereas Navy air defenders (i.e.,

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<sup>155</sup> See, for example, [http://www.chips.navy.mil/archives/03\\_fall/Web\\_pages/Web\\_Services.htm](http://www.chips.navy.mil/archives/03_fall/Web_pages/Web_Services.htm) for a quick illustration of some sample interoperability issues just within the Navy. An illustrative Navy instruction, OPNAVINST 9410.5B, "Navy Interoperability Requirements, Certification and Testing of Navy Tactical C4ISR Systems Implementing Procedural Interface Standards," dated February 28, 2008, serves to demonstrate the organizational difficulties involved in implementation of interoperability requirements within the Service.

<sup>156</sup> A classic discussion of the role of Service cultures may be found in Carl Builder, *The Masks of War: American Military Styles in Strategy and Analysis*, (Baltimore: Johns Hopkins University Press, 1989).

individual warships or fighter units) typically act “by negation,” Air Force (and Army) air and missile defense generally works under “positive control.”<sup>157</sup> Where such tactics and procedures differ significantly, they would impede procedural interoperability considerably. Moreover, such differences in tactics, procedures and command approach often reflect or influence the requirements and technical specifications each Service imposes on the design of the systems it acquires.

Thus the AirSea Battle concept requires both Services to identify key mission areas and tasks in which their units would operate in an integrated fashion. Then dual-Service tactics and procedures—the operational “nuts and bolts”—would need to be established to enable the effective execution of these missions and tasks, and incorporated into dual-Service doctrine. Once established as doctrine, recurrent dual-Service training and routine exercising of integrated missions and operations must become the norm.

Much of the above would go against the institutional grain of each Service, since the impact on Service culture and ethos could be considerable. Thus change of this kind could well take a long time to implement as older personnel depart and a new generation replaces them.

### **Substantial R&D and Acquisition Timelines**

Many individual capabilities (e.g., unmanned carrier strike; a new long-range bomber; unmanned underwater vehicles) cited in preceding chapters as important elements in an AirSea Battle concept would require development, fielding, and integration of sophisticated technologies and systems that entail lengthy timelines to procure. To be sure, some of the very prolonged acquisition timelines the Department of Defense has labored under in recent decades, for example for producing new air platforms or new classes of warships, could perhaps be reduced through fundamental acquisition reforms. Other systems, however, due to their complexity, will still have lengthy development timelines. For example, in 2008 concept development began for the successors to the Ohio-class SSBNs. These boats are not expected to enter the fleet before the mid-2020s. Similarly, a new long-range bomber would probably require at least a decade of development prior to initial fielding.

Replacing manned platforms by unmanned or optionally manned platforms for increasingly sophisticated missions and tasks will also take considerable time, owing to technological challenges and Service-cultural resistance. An example is found in the continuing development of the Navy Unmanned Combat

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<sup>157</sup> The Navy typically operates using a “command by negation” policy that is Service-culturally deeply informed by its tradition of independent command at sea. That policy authorizes (and expects) that commanders will take the initiative and act unless they are ordered not to. This contrasts with the Air Force policy of “positive control,” wherein action is affirmatively directed by the specified level of command.

Air System (N-UCAS); both the Air Force (while N-UCAS was J-UCAS, a dual-Service program) and Navy initially lacked enthusiasm for this capability, with the latter skeptical as to the feasibility and desirability of operating both manned and unmanned aircraft from its carriers. Now, having assumed sole responsibility for the program, the Navy is moving forward briskly, with initial N-UCAS carrier demonstrations expected by FY2013.<sup>158</sup> Still, it will take years of operational testing and evaluation, developing proper operational procedures for carrier launch and recovery operations, and integrating the carrier's manned and unmanned assets in flight operations before unmanned systems join the carrier air wing in substantial numbers.

There are also unknown timelines for various systems. For example, claims that operationally significant directed-energy weapons (DEW) are “just around the corner” have been circulating for two decades. That being said, there have recently been dramatic improvements in DEW performance.<sup>159</sup> Simply stated, it is difficult to predict just when such systems will be operationalized and fielded in significant numbers, what their capabilities will ultimately be, and whether and where they will be cost-effective. However, given the huge potential boost in military effectiveness that technologies like directed-energy portend, they must be pursued and, if and when a breakthrough is made, exploited rapidly. Similarly, there is considerable interest in hypervelocity weapons, which if both operationally effective and cost-effective, could offer the US military a potent new strike option.

In short, many of the potential constituent parts of an AirSea Battle concept would take many years to acquire, even if the decisions are made in the near-term to invest in them. In that sense, implementing an AirSea Battle concept would represent an evolutionary, not revolutionary, change, much as it took several decades for the Navy to develop its fast carrier task forces and the Army Air Corps its strategic bombardment capabilities leading up to World War II.

### Feasible Migration Path

Another important aspect of implementing an AirSea Battle concept is that there must be a feasible “migration path” that facilitates the transition from today's forces along a financially viable path, all the while maintaining near-term mission and combat readiness.

Such a path needs to take into consideration that many of today's Air Force and Navy assets will still be in service for decades if they are kept until they reach the end of their expected service lives. It is generally difficult to justify

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<sup>158</sup> See <http://www.defpro.com/news/details/13250/>.

<sup>159</sup> See Thomas Ehrhard, Andrew Krepinevich, and Barry Watts, “Near-Term Prospects for Battlefield Directed-Energy Weapons,” CSBA Backgrounder, January 2009.

to Congress and the public decommissioning various assets prematurely in the interest of acquiring new capabilities when the old ones seem “good enough.”<sup>160</sup> Thus the Department of Defense and the two Services would need to have compelling arguments to justify funding to enable the migration, particularly if it entailed significant new expenditures not offset by significant divestitures of expensive “wasting assets.”<sup>161</sup> More sobering still is the prospect that in the current dismal economic climate, even a compelling argument may be insufficient to loosen the nation’s purse strings.

Planning for a feasible migration path could not be done individually by Service. Rather, as a minimum, it would require coordinated dual-Service planning.<sup>162</sup> A crucial prerequisite for this would be Air Force and Navy agreement on the main elements comprising the substance of the AirSea Battle concept. This agreement would have to be given life through both Services’ planning and programming. This would require an unprecedented degree of coordination. Given the timeframe involved, the FYDP planning horizon would be too limiting. Thus the Air Force and Navy would have to establish a mechanism for facilitating closely coordinated, ongoing longer-term planning for both Services.<sup>163</sup>

## Service Buy-In

Perhaps the most essential prerequisite for successfully implementing an AirSea Battle concept is buy-in by the Air Force and Navy. For this to occur there must be clear institutional incentives for each. Both must be willing to alter long-standing

<sup>160</sup> This kind of argument in Britain in the 1920s was a major factor in preventing the Royal Navy from developing and acquiring modern aircraft carriers prior to World War II. As the first operators of carriers during World War I, the Royal Navy had several of them in the early 1920s, thus the British parliament refused to fund newer ones. As a result, the Royal Navy could not experiment with new capabilities and procedures, and thus remained largely limited to the “realm of the then-possible.” See Jan van Tol, “Military Innovation and Carrier Aviation,” *Joint Forces Quarterly*, Summer 1997, pp. 77–87, and *Joint Forces Quarterly*, Fall/Winter 1997, pp.97–109.

<sup>161</sup> See Krepinevich, “The Pentagon’s Wasting Assets.”

<sup>162</sup> The other two Services would also need to be engaged at some point, particularly with regard to joint operations for which the Air Force and/or Navy provide support to ground operations. This would be particularly important, once again, in the C2 and ISR realm. Historically, however, joint all-Service planning and acquisition generally has been inefficient and tended to result in prolonged decision timelines and lowest common denominator solutions. Given the increasing specialization of the Services with regard to future missions implied in the 2010 QDR (i.e., the Army and Marine Corps will tend to focus on irregular warfare, while the Air Force and Navy will focus on high-end conflicts) and the inherent frictions involved in getting even two Services to cooperate on matters affecting their core institutional interests, pragmatically it would make sense that initial AirSea Battle development work be done on a dual-Service basis.

<sup>163</sup> By way of loose historical analogy, after US military operations during the 1898 Spanish-American war were significantly impeded by lack of cooperation between the Army and Navy at either the planning or operational level, President Theodore Roosevelt established the Joint Army and Navy Board (in 1903), comprising representatives from the military heads and chief planners of both the Navy’s General Board and the Army’s General Staff to act as an “advisory committee” to plan joint operations and resolve problems of common rivalry between the two Services.

cultural norms, including accepting non-traditional ways of conducting operations and changes to career paths for a subset of their officer corps.

### *Institutional Incentives*

Institutional incentives can take two forms: increased operational effectiveness and substantial cost efficiencies.<sup>164</sup>

Operational effectiveness enhancements would follow from each Service's assets or capabilities being able to support or reinforce the other's operations directly as discussed in Chapter 3. Examples include sea-based missile defense of forward Air Force bases; submarine-launched anti-IADS strikes in support of Air Force penetration missions; Air Force penetrating attacks against key PLA targets that reduce the threat from long-range missile attacks against high-value warships; Navy carrier-based fighters protecting large Air Force stand-off assets such as tankers and ISR aircraft from PLA long-range fighter attack over large ocean expanses; maritime convoy operations to maintain the SLOCs needed to sustain Air Force logistics flows; Air Force conduct of offensive mining operations in support of the ASW sub-campaign; and Air Force maritime strike support for lower-end Navy assets conducting MIO, to name but a few.

Cost efficiencies would come from initiatives like dual-Service development and fielding of common systems such as EW jamming pods, long-range cruise missiles and other ordnance, and common C2, ISR and PED architectures. The principal efficiencies would derive from moving from today's de facto acquisition model wherein each Service makes overlapping and sometimes redundant investments in systems optimized for its own purposes that later turn out to be non-interoperable with the other's systems, to a model wherein a, if not the, leading key performance parameter (KPP) is compatibility with common interoperable architectures.

### *Significant Cultural Changes*

Changing organizational culture significantly is typically very difficult.<sup>165</sup> This is particularly the case for military organizations with long histories marked by repeated success and a very strong Service ethos. An AirSea Battle concept neither

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<sup>164</sup> It could be argued that "new missions" would be a third institutional incentive, in that new missions sometimes (but not always) carry the promise of new funding and new constituencies. However, this often presupposes that it is a "zero sum game," as shown by past bitter inter-Service battles over roles and missions. This paper argues that an AirSea Battle concept would be a "positive sum game," in which both the Air Force and Navy stand to gain considerably in terms of overall operational effectiveness and cost efficiencies.

<sup>165</sup> For a good illustrative discussion on the role of Service culture impacting one specific mission, see Major Rhett Lawing, "American Armed Forces' Service Culture Impact on Close Air Support," Air and Space Power Journal, December 18, 2006, accessed at <http://www.airpower.maxwell.af.mil/airchronicles/cc/lawing.html>.



could nor would deliberately seek to attempt such change. However, some of its elements as suggested in the preceding chapter would inevitably have impact on elements of each Service's culture.

One element of Service culture traditionally has been pride in executing "its" roles and missions. Services have tended to fight perceived "intrusions" by other Services on their roles and missions for various reasons, including sustaining an advantage in the competition for resources and/or preserving pride of place in a desired role in the national military strategy. Services have also been motivated to protect institutional traditions (Service-directed vice Joint-directed operations) or sub-cultures (e.g., the horse cavalry). An AirSea Battle concept will almost surely result in some "intrusions" by one Service into what has traditionally been the other's warfighting domain. This will likely occur, either for reasons of operational synergy or to reduce redundancies in Service capabilities that will no longer be affordable in the future, or both. A greater Air Force role in maritime strike would be a salient example. A greater Navy role in counter-space operations could be another. This will require a leap of faith by each Service that the other can — and will — provide it with critical supporting capabilities.

Another element of Service culture is the "command style" a Service uses for its operations. As noted earlier, whereas the Navy has traditionally exercised "command by negation," the Air Force has generally relied on "positive control," or more centrally directed operations. Both these styles evolved for specific reasons over long periods of time. They create a set of expectations on how individuals and units will act and operate that go to the heart of each Service's culture. As an AirSea Battle concept entails a much higher level of operational integration than has historically been the case, the inherent differences in Air Force and Navy approaches will need to be addressed. For example, should the Air Force go to a "mission orders" approach at the wing or air-task force level rather than maintain its traditional centralized planning at the theater AOC level, particularly if operations in a major future war could well transpire in a seriously degraded communications environment?<sup>166</sup> Or should the Navy allow off-board weapons firing for certain kinds of missions (e.g., integrated air and missile defense)? How should the Services conduct combined operations for missions such as suppression of enemy air defenses when both have tended to have their own separate tactics and procedures for such missions?

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<sup>166</sup> During the 1990–91 Desert Shield and Desert Storm operations, the differing ways the Air Force and Navy approached air operations planning, which reflected each Service's institutional culture, put undue burdens on their joint operations. While many of those differences have since been resolved to one degree or another, it remains open to question whether today's air operations planning construct would remain viable in the severely communications-degraded environment that may obtain in future major warfare. See, for example, [http://aupress.maxwell.af.mil/saas\\_Theses/SAASS\\_Out/Fischer/fischer.pdf](http://aupress.maxwell.af.mil/saas_Theses/SAASS_Out/Fischer/fischer.pdf) for a cogent argument for decentralized tactical planning through use of mission-type orders.

The strong Service identification officers tend to have is another significant cultural factor. Even with all the emphasis on “jointness” since the 1986 Goldwater-Nichols Act, most officers think of themselves first and foremost as Air Force or Navy officers, not as “Joint officers.” And yet, an AirSea Battle doctrine could require creating a specialized corps of officers with deep knowledge of and experience with integrated AirSea operations. Given the postulated complexity of future AirSea operations, the likely required level of operational specialization could require both Air Force and Navy officers to spend the majority of their careers being trained and educated for inherently dual-Service operations.<sup>167</sup>

Another important cultural change would involve one of the most jealously guarded Service prerogatives, namely execution of US Code Title 10 imperatives to train and equip Service forces. Given the level of postulated future Air Force and Navy integrated operations and the combined investments required to enable them, it would be imperative for both Services to closely coordinate their planning, programming and budgeting for interoperable common systems, particularly in the area of C2, communications and ISR. Determining unfunded priorities would require similar coordination. This implies an unprecedentedly close relationship in an area that historically has been a major source of Service rivalry and friction.

## INVESTMENTS AND DIVESTMENTS

This paper suggests investments in new capabilities and capacities required to implement a coherent AirSea Battle concept. They include essential cross-Service capabilities, especially with regard to interoperability of C2, ISR and PED architectures. Other cross-Service capabilities, such as common EW systems and various kinds of ordnance, while not essential should yield substantial increases in the overall effectiveness of AirSea Battle operations. Yet the migration to these would not come cheaply.

This is a serious potential obstacle at a time when the United States confronts the prospect of a prolonged economic downturn, with a corresponding downward

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<sup>167</sup> Today’s career tracks have superimposed multiple wickets that officers must pass through in order to remain competitive for promotion. These include such requirements as advanced education, qualification as Joint Service Officers, and duty at Service headquarters, in addition to qualifying and advancing within one’s primary warfare community. For the Navy, the underlying implicit assumption may be characterized as, “every Ensign a potential Chief of Naval Operations.” This has tended to create generalists (or “jacks of all trades”) rather than experts at both the tactical and the operational levels of war. Historically, Navy officers who depart the standard career track and are repeatedly assigned instead to training commands and operational staffs, i.e., the very organizations that actually train units for and conduct combat operations, tend not to be promoted to the more senior ranks. A viable AirSea Battle concept should instead put a premium on creating (and professionally rewarding) a core of officers who specialize in the complex AirSea operations expected in future warfare in aerospace-maritime theaters. This is not the kind of skill that can be acquired during the occasional inter-Service exchange tour.

pressure on defense spending. Absent a disruptive event that would dramatically increase the American people's perceived threat to their security, implementing an AirSea Battle concept would entail significant reductions in spending for other programs and forces. Changes on this scale typically have created considerable bureaucratic and political turmoil, as champions of various programs strive to keep theirs on track at the expense of others.

A few broad metrics might apply in thinking about candidates for divestment or significantly reduced procurement. First, certain kinds of forces would be essentially unusable due to their vulnerability during the early stages of a major conventional war against a high-end adversary, and would remain so for a prolonged period if the threats to them could not be mitigated. For example, land- and sea-based short-ranged tactical strike aircraft might be unemployable early in such a conflict. Yet, by far the largest Program of Record acquisition program in the coming years is precisely to buy those kinds of assets. As another example, aircraft carriers remain useful platforms — but perhaps not for prompt strike operations as in the past. This raises the question of why carriers would need to be as sophisticated and costly as the current Ford-class ships will be, since they would not be required for non-high-end operations given their relatively high vulnerability against a first-class A2/AD threat.<sup>168</sup>

Second, Service-specific systems supporting key missions and tasks that both Services contribute to would appear the best candidates for preferred funding. These could include systems supporting interoperable C2, ISR, and PED architectures, common ordnance, EW systems, and meteorological and oceanographic systems just to name a few.

Third, future air and maritime capabilities with the versatility to perform a wide range of missions, potentially by incorporating the capacity to accept modular mission packages, may be candidates for funding and development. The Navy's LCS is an early example of such a modular concept. A future fleet of Air Force support aircraft based on a common platform could be designed to accept modular mission packages (e.g., for supporting missions such as EW, high-capacity communications relay, employment of various sensor suites) to give commanders maximal operational flexibility.

Another area of potential divestment will come from the likely substantial drawdown of ground forces in Afghanistan and Iraq over the next decade, as the Defense Department shifts to a more indirect approach to addressing irregular threats. The savings from a reduction of one hundred thousand or more active-duty soldiers and marines would result in considerable savings in personnel

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<sup>168</sup> The intent here is not to revisit the old "small carrier versus large carrier" debate. Nimitz-class carriers will remain highly versatile and useful across a range of contingencies and, in a robust A2/AD environment could perform useful missions of the kind discussed in this paper. The much more expensive Ford-class would be "overkill" in lesser contingencies yet remain just as vulnerable to high-end A2/AD threats as the older ships.

and operations and maintenance (O&M) costs, as well as lower equipment procurement requirements for reduced maneuver units.<sup>169</sup>

Although we provide some general guidance regarding forces and programs, presenting a detailed Program of Record forces lies beyond the scope of this paper. History shows that the details are best determined after a vigorous series of wargames and field exercises, informed by serious analysis. Experience also shows that the sooner the Defense Department engages in such activities, the better informed its resource decisions will be.

## VARYING IMPLEMENTATION TIMELINES

The timelines required for implementation of these AirSea Battle initiatives would vary considerably, depending on the nature of the initiative. Some would necessarily entail nearly-irreducible timelines due to inherent challenges to be overcome, while others would depend on the level of investment, and thus be adjustable as a function of recurrent discrete political and/or budgetary choices.

As noted earlier, many of the potential constituent elements of an AirSea Battle concept would take many years to acquire or implement, even if the decisions were made in the near-term to invest in them. Certainly this applies to R&D and acquisition of particularly complex systems. Moreover, even as new systems and capabilities are acquired and evolve, it takes additional time to develop the operational concepts that enable them to be employed effectively as part of an overall force.<sup>170</sup> Other measures can be implemented on a more incremental basis (e.g., hardening of selected bases and facilities, increasing inventories of particular kinds of ordnance, or buying aircraft or ships at higher rates), as funding becomes available.

The capabilities with the longest lead times — and thus the ones that should be initiated the earliest — are those that are particularly complex from an overall systemic perspective. One such set of capabilities are those involved in the Air Force and Navy migrating to fully compatible and interoperable, if not common, C2, ISR and PED architectures. The initial key challenge is identifying the capabilities needed and concurring on the priority they must be accorded. Various affected systems and components would have to be adapted to incorporate the

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<sup>169</sup> This figure approximates the increase in ground forces after 2005 in response to temporary additional demands for troops in Iraq and Afghanistan. Once major US troop deployments in those countries are over, the rationale for the elevated active component ground force levels will likely disappear.

<sup>170</sup> The contemporary case of the LCS illustrates this point well. With two LCSs newly commissioned, the Navy now must develop concepts of operation that demonstrate how these new kinds of ships can best be employed. Such development will come from experimenting with the actual ships to see what kinds of tasks and missions they are best suited for, and how they will operate with the rest of the fleet.

new standards. This is particularly challenging (and potentially prolonged and expensive) due to the sheer number of items involved. Thus early Air Force and Navy agreement on efficient migration paths for these architectures is particularly important.

Secondly, developing the group of officers who specialize in dual-Service operations will take many years. Indeed, their development would mirror the development and implementation of the AirSea Battle in its ultimate form, a process that could take the better part of a decade, and perhaps longer when one considers that some major systems may not enter the force in significant numbers until the mid-2020s. It also will likely take as long for both Services to divest themselves of the older generation of officers, some or many of whom could prove unable (or unwilling) to embrace the new way of operating.

## THE NEED FOR CHAMPIONS

Success in implementing something of the contemplated scope of an AirSea Battle concept like that discussed in the previous chapter would depend crucially on maintaining the active support over time of diverse key constituencies. Within the Defense Department, these would include the senior leadership of the Air Force and Navy and of the Department's senior civilian leadership. Almost as important, it would also require the support of key constituencies within the Pentagon military and civilian bureaucracies in order to overcome the internal opposition of various kinds that can steadily grind major initiatives to a halt. Then, within both the Air Force and Navy, any new concept would need senior proponents to help drive the actual implementation of the leading initiatives and components of the concept.<sup>171</sup>

Key external actors would also play a critical, perhaps determinative role. Given the lengthy timelines entailed in change of the scope and scale that an AirSea Battle concept envisions, support for it must extend across successive presidential administrations. Similarly, successive Congresses must continue to support and fund its implementation. For both the executive and legislative branches, such support must be independent of which political party occupies the White House or has the majority in each House of Congress.

Perhaps the ultimate prerequisite for winning and sustaining such support for an AirSea Battle operational concept (and eventually doctrine) among these diverse interested parties or stakeholders is the telling of a “compelling and

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<sup>171</sup> For example, during the interwar years, development of naval aviation was aided crucially by senior leaders such as Admiral William Moffett, chief of the Bureau of Aeronautics from 1921 to 1933. Similarly, the creation and implementation of air power doctrine was driven during the 1930s by persistent forceful advocacy by men such as General Hap Arnold, later Chief of the Army Air Forces during World War II.

enduring story.”<sup>172</sup> In other words, the reasoning behind the AirSea Battle concept must remain so compelling by virtue of the soundness of its underlying logic that the concept derives its enduring support not from a particular administration or Congress or a given set of military and civilian leaders serving in senior positions for a few years, but from a firmly grounded, widely shared belief that it offers an operationally effective as well as cost-efficient approach to dealing with a wide range of possible futures, primarily in the Western Pacific theater, but also in other theaters.

### Metrics for Success

Given the demonstrable complexity of developing and implementing an AirSea Battle concept, how would proponents be able to tell whether they are achieving success?

Early and vocal support by senior political and military leaders would be essential to get AirSea Battle out of the realm of the theoretical. Among the earliest indicators of seriousness of purpose would be the willingness of senior Defense Department and Service leaders to speak publicly and recurrently to a wide range of audiences, including Service personnel at all levels, the Congress, the American public and the press, and industry.

Significant and measurable progress in undertaking some of the most difficult and time-intensive dual-Service elements of AirSea Battle, particularly those central to creating interoperable C2, ISR and PED architectures, would be an important metric in terms of genuine Service commitment to AirSea Battle.

An important bureaucratic indicator would be demonstrated Air Force and Navy success in developing the mutual trust necessary for realistic and detailed coordination of their programming and budgeting in those areas pertaining directly to AirSea Battle. All the Services historically have jealously guarded their prerogatives in this regard and often fought bitterly over resources; thus successfully breaking this paradigm would be a key signal of seriousness of purpose.

Ultimately the most reliable indicator of success comes from “following the money.” If Air Force and Navy programs and budgets give priority to the necessary supporting investments by both Services, and if successive administrations and Congresses keep funding the requirements to implement AirSea Battle, then the prospects for successful implementation would be correspondingly bright.

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<sup>172</sup> This felicitous phrase was frequently used by the late Rear Admiral Wayne “Father of AEGIS” Meyer to remind the Navy that large, complex programs required steady support across successive administrations and Congresses due to the sustained costs and the prolonged development and acquisition process involved in such efforts. Meyer argued that success was only possible if the underlying rationale for a program was compelling, i.e., clearly met a genuine operational or strategic requirement that was persuasive to political members of either major party, and would endure over the long term.







**Center for Strategic and Budgetary Assessments**

1667 K Street, NW, Suite 900

Washington, DC 20006

Tel. 202-331-7990 • Fax 202-331-8019

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